SEQUENCE LISTING

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       Hu, Zhihao
       Schirmer, Andreas
       Ward, Shannon L.
       Reeves, Christopher

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24

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25

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<213> Streptomyces bikiniensis

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            20   25   30
Leu Gly Leu Met Gly Arg Leu Val Val Glu Gly Val Val Val Thr Pro
        35   40   45
Ile Trp Pro Pro Thr Gly Val Ala Val Ala Ala Leu Leu Leu Leu Gly
    50   55   60

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Ala Arg Val Trp Pro Gly Ile Ala Leu Gly Ser Phe Leu Val Ile Ala
65                  70                  75                  80
Ser Leu Thr Thr Pro Gly Pro Thr Thr Val Val Thr Val Val Ser Asn
                85                  90                  95
Thr Val Ala Pro Leu Cys Ala Phe Leu Leu Leu Thr Arg Ala Gly Phe
                100                 105                 110
Arg Leu Asp Met Ala Arg Leu Arg Asp Gly Leu Ser Leu Val Phe Leu
            115                 120                 125
Gly Gly Phe Gly Ala Met Leu Ile Ser Ala Thr Ala Gly Val Gly Leu
        130                 135                 140
Gln Val Ala Lys Ser Ser Leu Asp Thr Thr Glu Phe Trp Pro Val Trp
145                 150                 155                 160
Leu Ala Trp Trp Val Gly Asp Thr Met Gly Val Leu Leu Val Ala Pro
                165                 170                 175
Leu Leu Leu Val Leu Ala Gly Pro Ala Gly Arg Phe Arg Val Arg Arg
                180                 185                 190
Trp Lys Glu Ala Ala Leu Leu Gly Leu Ala Thr Leu Ile Leu Met Pro
        195                 200                 205
Met Ala Val Leu Ser Pro Val Gly Met Leu Phe Leu Val Phe Pro Leu
        210                 215                 220
Leu Ile Trp Ala Ala Leu Arg Phe Gln Leu Thr Gly Ser Met Leu Cys
225                 230                 235                 240
Ala Leu Phe Ala Ser Val Leu Ala Thr Phe Glu Ala Asn Ala Gly Arg
                245                 250                 255
Gly Gly Phe Leu His Leu Ser Asp Val Glu Ile Met Ala Lys Leu Gln
                260                 265                 270
Ala Phe Asn Gly Ser Ala Ala Leu Thr Ala Leu Leu Leu Ala Ser Val
        275                 280                 285
Ile Thr Glu Gln Arg Ala Thr Arg Arg Ser Val Arg Arg Ala Cys Arg
        290                 295                 300
Glu Leu Ala Glu Val Leu Glu His Leu Ala Ala Gly Glu Pro Ala Pro
305                 310                 315                 320
Gly Pro Pro Gly Thr Ala Glu Ser Arg Ala Ala Pro Ser Gly Gly Pro
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Arg Asp Pro Phe Ser Glu Gly
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<210> 3
<211> 279
<212> PRT
<213> Streptomyces bikiniensis

<400> 3
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            20                  25                  30
Ser Arg Val Glu Leu Ala Val Ala Leu Gln Arg Gly Met Leu Pro Ser
            35                  40                  45
Asp Leu Pro Ser Leu Pro Gly Ala Arg Leu Ala Val Arg Tyr Glu Pro
        50                  55                  60
Ala Asn His Gly Leu Asn Val Gly Gly Asp Trp Tyr Asp Ala Phe Pro
65                  70                  75                  80
Leu Pro Gly Gly Arg Ile Gly Met Ser Ile Gly Asp Val Gln Gly His
                85                  90                  95
Asn Ile Glu Ala Ala Ala Phe Met Gly Gln Val Arg Val Ala Leu Arg
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27

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Ala Leu Ala Ser Val Thr Ala Asp Pro Gly Glu Leu Leu Gly Arg Thr
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        130                      135                      140
Phe Leu Arg Leu Asp Pro Ala Ala Gly Thr Leu Glu Cys Ala Arg Ala
145                      150                      155                      160
Gly His Ile Pro His Ile Trp Ala Thr Ala Asp Gly Arg Ser Gly Ile
                   165                  .    170                      175
Asp Asp Ser Glu Gly Gly Pro Pro Leu Gly Val Leu Arg Gly Ala Asp
                   180                      185                      190
Tyr Pro Ala Thr Arg His Arg Leu Thr Ala Asp Gly Val Phe Val Leu
        195                      200                      205
Leu Thr Asp Gly Val Val Glu Gly Pro Ser Leu His Ile Asp Glu Gly
        210                      215                      220
Leu Asp Arg Val Thr Arg Leu Ala Gly Ile Thr Ala Val Ala Gly Leu
225                      230                      235                      240
Asp Val Asp Ala Leu Ala Thr Ala Val Met Arg Leu Ala Ala Thr Val
                   245                      250                      255
Gly His Glu Asp Asp Ala Ala Val Leu Val Val Gly His Asp Gly Gly
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Pro Pro Arg Pro Ala Thr Gly
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<210> 4
<211> 293
<212> PRT
<213> Streptomyces bikiniensis

<400> 4
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Val His Arg Leu Gly Phe Gly Ala Leu Arg Leu Thr Gly Pro Gly Tyr
            20                      25                      30  .
Trp Gly Pro Pro Glu Asp Arg Glu Ala Ala Ile Ser Thr Ala Arg Leu
        35                      40                      45
Ala Val Asp Leu Gly Val Ser Phe Ile Asp Thr Ala Asp Ser Tyr Gly
        50                      55                      60
Leu Gly Ser Asn Glu Glu Leu Leu Ala Glu Ala Leu Arg Pro Tyr Pro
65                      70            _        75                      80
Asp Gly Leu Val Ile Ala Thr Lys Ala Gly Gln Cys Arg Pro Arg Pro
            85                      90                      95
Asp Gln Trp Val Pro Cys Gly Arg Pro Glu Tyr Leu Arg Gln Gln Ala
            100                      105                      110
Glu Leu Ser Leu Arg Arg Leu Arg Leu Asp Arg Ile Asp Leu Phe Gln
        115                      120                      125
Leu His Arg Ile Asp Pro Lys Val Pro Ala Ala Glu Gln Phe Gly Ala
        130                      135                      140
Leu Gly Glu Leu Gln Asp Glu Gly Lys Ile Arg His Ile Gly Leu Ser
145                      150                      155                      160
Lys Val Thr Val Arg Glu Val Glu Ala Ala Arg Glu His Ile Thr Val
                   165                      170                      175
Ala Ser Val Gln Asn Val Tyr Asn Leu Thr Asp Arg Arg Asn Asp Glu
                   180                      185                      190
Val Val Glu Tyr Cys Glu Lys His Glu Ile Ala Phe Ile Ala Trp Leu
            195                      200                      205
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Pro Ile Ala Arg Gly Ala Leu Ala Ala Gly Gly Ser Pro Val Ala Asp
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Ile Ala Thr Glu Leu Glu Val Ser Ala Gly Gln Val Ala Leu Ala Trp
225   230   235   240
Leu Leu His Arg Ser Pro Ala Val Ile Pro Ile Pro Gly Thr Ser Ser
              245   250   255
Pro Ala His Leu Arg Glu Asn Val Ala Ala Ser Gly Ile Ala Leu Ser
              260   265   270
Asp Gly Gln Leu Ala Arg Leu Asn Ala Leu Gly Arg Thr His Asp Asp
          275   280   285
Ala Thr Val Pro Val
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<210> 5
<211> 405
<212> PRT
<213> Streptomyces bikiniensis

<400> 5
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              20   25   30
Arg Ala Arg Phe Leu Asp Arg Val Asn Trp Ala Leu Asp His Gln Trp
          35   40   45
Leu Thr Asn Gly Gly Pro Leu Ala Arg Glu Phe Glu Gln Arg Val Ala
    50   55   60
Glu Leu Ala Gly Val Arg Tyr Cys Val Ser Thr Cys Asn Ala Thr Val
65   70   75   80
Ala Leu Gln Leu Leu Ala Arg Ala Ala Asp Leu Ser Gly Glu Val Ile
              85   90   95
Met Pro Ser Leu Thr Phe Pro Ala Thr Ala Gln Ala Phe Arg Trp Leu
              100   105   110
Gly Leu Thr Pro Val Phe Val Asp Ile Asp Pro Ala Thr Asn Cys Leu
              115   120   125
Asp Pro Asp Leu Ile Glu Ala Ala Ile Thr Pro Arg Thr Ser Ala Val
    130   135   140
Val Pro Val His Leu Trp Gly Arg Pro Cys Ala Val Asp Arg Leu Ala
145   150   155   160
Lys Val Ala Ala Asp His Gly Leu Arg Leu Phe Tyr Asp Ala Ala His
              165   170   175
Gly Leu Gly Cys Thr Ser Glu Gly Gln Pro Ile Gly Gly Phe Gly Gln
              180   185   190
Ala Glu Val Phe Ser Phe His Ala Thr Lys Val Val Asn Ala Phe Glu
              195   200   205
Gly Gly Ala Val Val Thr Asp Asp Glu Arg Leu Ala Gln Arg Val Arg
    210   215   220
Ala Met His Asn Phe Gly Phe Thr Gln Gly Arg Val Ser Thr Glu Thr
225   230   235   240
Gly Thr Asn Gly Lys Met Thr Glu Ala Ala Ala Ala Met Gly Leu Thr
              245   250   255
Ser Leu Asp Ala Phe Glu Glu Thr Val Arg Arg Asn Glu Ala Asn His
              260   265   270
Asp Asp Tyr Arg Ser Glu Leu Ala Gly Leu Ala Gly Leu Lys Val Met
          275   280   285
Glu Phe Asp Arg Ala Glu Arg Asn Asn Tyr His Tyr Leu Val Val Glu

29

```
              290                   295                   300
Val Asp Ala Ala Val Thr Gly Val His Arg Asp Leu Leu Asp Glu Val
305                   310                   315                   320
Leu Arg Ala Glu Asn Ile Met Cys Gln Arg Tyr Phe Ser Pro Gly Cys
                  325                   330                   335
His Glu Met Glu Pro Tyr Arg Ser Glu Arg Pro Val Ser Leu Pro His
                  340                   345                   350
Thr Glu Arg Leu Ala Arg Lys Val Leu Ala Leu Pro Thr Gly Pro Thr
                  355                   360                   365
Val Ser Arg Glu Asp Ile Arg Arg Val Cys Asp Ile Val Arg Leu Thr
                  370                   375                   380
Leu Glu Arg Gly His Glu Val Thr Arg Arg Ala Asp Glu Arg Val Pro
385                   390                   395                   400
Ser Thr Thr Ala Pro
                  405


<210> 6
<211> 259
<212> PRT
<213> Streptomyces bikiniensis

<400> 6
Met Lys Asn Val Val Ser Asn Thr Ile Tyr Gly Asp His Pro Thr Phe
  1               5                  10                  15
Pro Val Gly Met Asn Val Leu Asp Lys Glu Leu Ala Asp Arg Met Arg
                  20                  25                  30
Pro Gly Ala Glu Gly Pro Asp Val Glu Arg Gly Thr Phe Asp Ala Asp
              35                  40                  45
His Arg Ala Glu Gly Leu Asp Val Pro Thr Val Ala His Thr Met Ile
          50                  55                  60
Gly Leu Gln Arg Leu Asp Asn Ile Gln Arg Cys Val Glu Arg Val Leu
65                  70                  75                  80
Gln Asp Asp Val Pro Gly Asp Leu Ile Glu Thr Gly Val Trp Arg Gly
                  85                  90                  95
Gly Ala Cys Ile Leu Met Arg Ala Leu Leu Lys Ala His Gly Val Glu
                  100                 105                 110
Asp Arg Thr Val Trp Leu Ala Asp Ser Phe Ala Gly Val Pro Val Thr
                  115                 120                 125
Ser Glu Asp Ser His Pro Leu Asp Arg Ala Met Glu Phe His His Leu
          130                 135                 140
Asn Trp Val Leu Ser Cys Ser Glu Glu Gln Val Arg Glu Asn Phe Ala
145                 150                 155                 160
Arg Tyr Gly Leu Leu Asp Glu Gln Val Arg Phe Leu Pro Gly Met Phe
                  165                 170                 175
Ala Asp Thr Leu Pro Thr Ala Pro Ile Asp Arg Leu Ala Val Leu Arg
                  180                 185                 190
Val Asp Gly Asp Leu Tyr Glu Ser Thr Arg Asp Ala Leu Val Asn Leu
                  195                 200                 205
Tyr Pro Lys Leu Ser Val Gly Gly Phe Val Ile Val Asp Asp Tyr Leu
          210                 215                 220
Ile Pro Ala Cys Lys Gln Ala Val His Asp Tyr Arg Ser Glu His Gly
225                 230                 235                 240
Ile Asp Glu Pro Ile Glu Thr Val Asp Val Thr Gly Val Tyr Trp Arg
                  245                 250                 255
Arg Glu His
```

30

<210> 7
<211> 485
<212> PRT
<213> Streptomyces bikiniensis

<400> 7
```
Met Thr Ser His Ala Ser Thr Ala Ala Asp Pro Val Ala Leu Cys Ala
1               5                   10                  15
Arg Pro Gly Ala Asp Leu Pro Ala Ala Val His Thr Val His Arg Ala
            20                  25                  30
Leu Val Ser Asp Gly Arg Val Gly Val Asp Glu Gly Pro Thr Val Ala
            35                  40                  45
Arg Arg Leu Val Arg Leu Ala Glu Arg Tyr Gly Asn His Pro Phe Thr
    50                  55                  60
Pro Leu Glu Glu Ala Arg Arg Met Leu Asp Val Asp Arg Ala Ser Phe
65                  70                  75                  80
Gly Arg Leu Leu Gly Leu Phe Gly Arg Val Pro Glu Leu Arg His Ala
                85                  90                  95
Val Glu Asn Gly Pro Ala Gly Lys Tyr Trp Gln Asn Thr Leu Leu Pro
            100                 105                 110
Leu Glu Arg Arg Gly Val Phe Asp Ala Ala Leu Ala His Lys Pro Ala
            115                 120                 125
Phe Pro Tyr Val Val Gly Leu Tyr Pro Gly Pro Ser Cys Met Phe Arg
    130                 135                 140
Cys His Phe Cys Val Arg Val Thr Gly Ala Arg Tyr Asp Pro Ser Ala
145                 150                 155                 160
Leu Glu Ser Gly Asn Ala Met Phe Ala Ser Val Ile Asp Glu Ile Pro
                165                 170                 175
Ala Gly Asn Pro Tyr Ala Met Tyr Phe Ser Gly Gly Leu Glu Pro Leu
                180                 185                 190
Thr Asn Pro Gly Leu Gly Ala Leu Ser Ser Arg Ala Ala Ala Arg Gly
            195                 200                 205
Leu Arg Pro Thr Val Tyr Thr Asn Ser Phe Ala Leu Thr Glu Arg Thr
    210                 215                 220
Leu Asp Arg Gln Pro Gly Val Trp Asp Leu His Ala Val Arg Thr Ser
225                 230                 235                 240
Leu Tyr Gly Leu Asn Asp Glu Glu Tyr Glu Glu Thr Thr Gly Lys Arg
                245                 250                 255
Ala Ala Phe Gly Arg Val Arg Ala Asn Leu Arg Arg Phe Gln Gln Leu
            260                 265                 270
Arg Ser Glu Arg Glu Ser Pro Ile Arg Leu Gly Leu Ser Tyr Ile Val
    275                 280                 285
Leu Pro Gly Arg Val His Arg Leu Leu Asp Leu Val Asp Phe Ile Ala
    290                 295                 300
Asp Leu Asn Glu Ala Ala Pro Asp Arg Pro Val Asp Phe Leu Asn Val
305                 310                 315                 320
Arg Glu Asp Tyr Ser Gly Arg Glu Asp Gly Arg Leu Phe Glu Ala Glu
                325                 330                 335
Arg Ala Glu Leu Gln Glu Gly Leu Leu Ala Phe Glu Glu Ala Val Ser
            340                 345                 350
Arg Arg Thr Pro Thr Leu Asn Ile Asp Tyr Gly Tyr Ala Leu His Ser
            355                 360                 365
Leu Lys Thr Gly Ala Asp Ala Glu Leu Leu Arg Ile Arg Pro Gly Thr
    370                 375                 380
Met Arg Arg Ser Ala His Pro Gln Val Ser Val Gln Val Asp Leu Leu
```

31

```
385                 390                 395                 400
Gly Asp Val Tyr Leu Tyr Arg Glu Ala Gly Phe Pro Asp Leu Thr Gly
                405                 410                 415
Ala Asp Arg Tyr Val Ala Gly Arg Val Gly Pro Gly Thr Ser Leu Thr
            420                 425                 430
Glu Val Val Glu Arg Phe Val Asp Asp Gly Arg Leu Ile Ala Pro His
        435                 440                 445
Ala Gly Asp Glu Tyr Phe Met Asp Gly Phe Asp Gln Val Val Ala Ala
    450                 455                 460
Arg Leu Asn Gln Leu Glu Ala Asp Val Val Ala Gly Trp Glu Asp Ala
465                 470                 475                 480
Arg Gly Phe Leu Arg
                485


<210> 8
<211> 836
<212> PRT
<213> Streptomyces bikiniensis

<400> 8
Met Arg Thr Ala Thr Ser Ala Glu Arg Thr Ser Val Ser Met Leu Phe
 1               5                   10                  15
Gly Thr Thr Arg Thr Gly Arg Arg Ile Arg Arg Thr Val Gly Ser Ala
            20                  25                  30
Leu Ala Ala Leu Cys Val Gly Gly Leu Leu Thr Ala Pro Ser Ala Ala
        35                  40                  45
Gly Ala Pro Ala Ala Glu Pro Gly Thr Ala Arg Val Arg Gly Leu Val
    50                  55                  60
Ala Lys Met Thr Leu Asp Glu Lys Ile Ser Phe Val His Trp Thr Thr
65                  70                  75                  80
Gly Pro Val Gly Gly Pro Thr Met Thr Gly Ile Gly Tyr Leu Pro Gly
            85                  90                  95
Val Pro Arg Leu Gly Ile Pro Glu Leu Arg Thr Ala Asp Gly Pro Val
        100                 105                 110
Gly Ile Arg Leu Leu Gly Gly Thr Ala Thr Ala Met Pro Thr Pro Val
        115                 120                 125
Ala Leu Ala Ala Thr Phe Asp Glu Arg Leu Ala Glu Glu Tyr Gly Thr
    130                 135                 140
Val Leu Gly Arg Glu Gly Arg Ala Leu Gly Gln Asp Ile Val Leu Gly
145                 150                 155                 160
Pro Met Thr Asn Val Ile Arg Val Pro His Ala Gly Arg Asn Phe Glu
            165                 170                 175
Thr Tyr Ser Glu Asp Pro Leu Leu Ser Ser Arg Met Ala Ala His Glu
            180                 185                 190
Val Arg Gly Ile Gln Asn Gln Gly Leu Met Ala Thr Val Lys His Phe
            195                 200                 205
Ala Ala Asn Asn Gln Glu Tyr Gln Arg Glu Thr Ile Asp Ala Val Val
        210                 215                 220
Asp Glu Gln Thr Leu Gln Glu Val Glu Leu Pro Ala Phe Arg Ser Ala
225                 230                 235                 240
Val Arg Ala Gly Ala Ala Ser Val Met Cys Ser Tyr Asn Lys Val Asn
            245                 250                 255
Gly Ala His Ala Cys Gly Asn Glu His Leu Leu Gln Glu Val Leu Arg
        260                 265                 270
Glu Gln Trp Asp Phe Arg Gly Trp Val Val Ser Asp Trp Leu Ala Thr
        275                 280                 285
```

```
His Ala Thr Gly Asp Ile Thr Arg Gly Leu Asp Gln Glu Leu Gly Val
    290                 295                 300
Glu Leu Thr Leu Gly Gln Pro Val Pro Glu Ser Lys Tyr Phe Ser Ser
305                 310                 315                 320
Ala Leu Arg Ala Ala Val Arg Asp Gly Ser Val Pro Glu Ala Thr Leu
                325                 330                 335
Asp Arg Ser Val Val Arg Ile Leu Gly Gln Met Glu Arg Phe Gly Leu
                340                 345                 350
Leu Asp Gly Lys Ala Thr Glu Arg Pro Gln Arg Asp Pro Glu Ala Gly
            355                 360                 365
Arg Ala Ala Ala Arg Thr Ile Ala Glu Asn Gly Gly Val Leu Leu Arg
    370                 375                 380
Asn Glu Arg Arg Thr Leu Pro Leu Thr Gly Glu Asp Ala Thr Asp Ile
385                 390                 395                 400
Ala Val Ile Gly Asn Ser Ala Lys His Pro Lys Val Thr Gly Asn Gly
                405                 410                 415
Ser Ala His Val Ile Pro Asp Arg Ala Thr Ala Pro Val Asp Ala Leu
                420                 425                 430
Ala Arg Arg Ala Gly Glu Lys Ala Arg Val Val His Glu Pro Gly Glu
                435                 440                 445
Asp Leu Val Gly Val Pro Val Pro Glu Ser Ser Leu Thr Pro Ala Phe
    450                 455                 460
Thr Ser Gly Lys Gln Leu Asp Pro Ser Gly Gln Gly Val Phe Tyr Glu
465                 470                 475                 480
Gly Arg Leu Thr Val Pro Ala Asp Gly Asp Tyr Lys Ile Ala Phe Thr
                485                 490                 495
Ala Val Gly Gly Val Ala Asn Leu Gln Ile Ala Gly Gln Ser Ala Val
                500                 505                 510
Leu Gly Thr Glu Ala Phe Gly Thr Val Thr Thr Thr Met Arg Leu Thr
            515                 520                 525
Arg Gly Thr His Ala Val Thr Met Asn Gly Trp Ala Phe Glu Gln Thr
    530                 535                 540
Pro Leu Ser Val Glu Leu Ser Trp Val Thr Pro Glu Ala Ala Arg Asp
545                 550                 555                 560
Asp Phe Asp Arg Ala Val Ala Ala Ala Glu Ala Arg Thr Ala Val
                565                 570                 575
Val Phe Ala His Asp Asp Ser Ala Glu Gly Val Asp Arg Ser Ser Leu
                580                 585                 590
Ser Leu Pro Gly Arg Gln Asp Glu Leu Ile Ala Ala Ile Thr Lys Val
            595                 600                 605
Asn Pro Arg Thr Ile Val Val Leu Asn Thr Gly Ser Ser Val Leu Met
    610                 615                 620
Pro Trp Leu Arg Glu Thr Ala Ala Val Leu Glu Met Trp Tyr Pro Gly
625                 630                 635                 640
Gln Glu Gly Ala Glu Ala Thr Ala Ala Leu Leu Phe Gly Asp Ala Asn
                645                 650                 655
Pro Ser Gly Arg Leu Thr Gln Thr Phe Pro Ala Thr Glu Thr Gly His
            660                 665                 670
Pro Met Ala Gly Asp Pro His Arg Tyr Pro Gly Val Asp Gly Lys Glu
    675                 680                 685
Thr Tyr Ser Glu Gly Leu Asp Val Gly Tyr Arg Trp Tyr Asp Arg Thr
    690                 695                 700
Gly Val Ala Pro Leu Phe Pro Phe Gly Tyr Gly Leu Ser Tyr Thr Thr
705                 710                 715                 720
Phe Ala Tyr Ser Asp Leu Ser Val Ala Arg Thr Ala Arg Gly Leu Glu
                725                 730                 735
Ala Thr Val Thr Val Arg Asn Thr Gly Asp Arg Ala Gly Arg Glu Thr
```

33

```
                  740                         745                         750
Val Gln Val Tyr Leu Gly Ala Ser Pro Asp Thr Gln Ala Pro Gln Ala
              755                         760                 765
Leu Arg Lys Leu Ala Gly Phe Thr Lys Val Thr Leu Arg Pro Gly Glu
      770                         775                 780
Gln Arg Arg Val Thr Val Pro Val Asp Glu Gln Gln Leu Arg Tyr Trp
785                         790                 795                     800
Asp Thr Ala Ala Gly Thr Trp Lys Pro Gly Thr Gly Arg Arg Ala Val
                  805                     810                     815
His Val Gly Pro Ser Ala Ala Glu Thr Ser Leu Thr Thr Ser Val Thr
              820                     825                 830
Val Pro Ser Arg
          835


<210> 9
<211> 401
<212> PRT
<213> Streptomyces bikiniensis

<400> 9
Met Gly Leu Pro Leu Thr Ser Thr Lys Thr Ala Pro Val Ser Tyr Pro
  1               5                   10                  15
Phe Gly Arg Pro Glu Gly Leu Asp Leu Asp Glu Ala Tyr Glu Gln Ala
              20                  25                  30
Arg Lys Ser Glu Gly Leu Leu Trp Val His Met Pro Tyr Gly Glu Pro
          35                  40        ,           45
Gly Trp Leu Val Ser Arg Tyr Asp Asp Ala Arg Phe Val Leu Gly Asp
      50                  55                  60
Arg Arg Phe Ser His Ala Ala Glu Ala Glu Asn Asp Ala Pro Arg Met
65                  70                  75                      80
Arg Glu Leu Arg Thr Pro Asn Gly Ile Ile Gly Met Asp Ala Pro Asp
              85                  90                  95
His Thr Arg Leu Arg Gly Leu Val Thr Lys Ala Phe Thr Pro Arg Arg
              100                 105                 110
Val Glu Ala Met Arg Pro His Val Arg Arg Met Thr Ala Ser Leu Leu
              115                 120                 125
Arg Asp Met Thr Ala Leu Gly Ser Pro Val Asp Leu Val Asp His Tyr
      130                 135                 140
Ala Val Pro Leu Pro Val Ala Val Ile Cys Gly Leu Leu Gly Val Pro
145                 150                 155                     160
Glu Glu Asp Arg Asp Leu Phe Arg Gly Trp Cys Glu Ile Ala Met Ser
              165                 170                 175
Thr Ser Ser Leu Thr Ala Glu Asp His Val Arg Leu Ala Gly Glu Leu
          180                 185                 190
Thr Gly Tyr Leu Ala Asp Leu Ile Thr Ala Arg Arg Ala Ala Pro Arg
      195                 200                 205
Asp Asp Leu Val Ser Ala Leu Val Glu Ala Arg Asp Ala Gln Gly Arg
      210                 215                 220
Leu Ser Gln Glu Glu Leu Val Asp Leu Ile Val Phe Leu Leu Phe Ala
225                 230                 235                     240
Gly His Glu Thr Thr Ala Ser Gln Ile Ser Asn Phe Val Leu Val Leu
              245                 250                 255
Leu Glu Gln Pro Asp Gln Leu Ala Leu Leu Arg Asp Arg Pro Asp Leu
          260                 265                 270
Leu Asp Asn Ala Val Glu Glu Leu Thr Arg Phe Val Pro Leu Gly Ser
      275                 280                 285
```

```
Gln Ala Gly Phe Pro Arg Tyr Ala Thr Glu Asp Val Glu Val Gly Gly
    290                 295                 300
Thr Leu Val Arg Ala Gly Asp Pro Val Leu Val Gln Met Asn Ala Ala
305                 310                 315                 320
Asn Arg Asp Ala Leu Arg Phe Arg Ser Pro Gly Val Leu Asp Ile Thr
                325                 330                 335
Arg Asp Asp Ala Gly Arg His Leu Gly Tyr Gly His Gly Pro His His
                340                 345                 350
Cys Leu Gly Ala Ser Leu Ala Arg Leu Glu Leu Gln Glu Ala Leu Arg
                355                 360                 365
Thr Leu Leu Asp Glu Leu Pro Gly Leu His Leu Ala Gln Pro Val Glu
    370                 375                 380
Trp Lys Thr Glu Met Val Val Arg Gly Pro Arg Thr Met Leu Val Gly
385                 390                 395                 400
Trp


<210> 10

<211> 407
<212> PRT
<213> Streptomyces bikiniensis

<400> 10
Met Thr Ser Ser Cys Pro Val His Arg Thr Arg Pro Tyr Pro Phe Ser
  1               5                  10                  15
Pro Pro Glu Gly Ile Ala Leu Asp Pro Leu Tyr Ser Arg Leu Arg Glu
            20                  25                  30
His Glu Pro Val Ser Arg Ile Arg Met Pro Tyr Gly Gly Glu Ala Trp
            35                  40                  45
Leu Leu Thr Arg His Ala Asp Val Arg Ala Val Leu Gly Asp Pro Arg
        50                  55                  60
Phe Ser Met Glu Ala Gly Ala Gly Arg Asp Val Pro Arg Pro Thr Glu
65                  70                  75                  80
Tyr Pro Leu Pro Ala Gly Gly Leu Ile Ser Met Asp Pro Pro Gly His
                85                  90                  95
Thr Arg Leu Arg Arg Leu Ala Gly Lys Ala Phe Thr Ala Arg Arg Val
            100                 105                 110
Glu Glu Leu Arg Pro Arg Val Ser Arg Phe Thr Asp Glu Leu Leu Asp
        115                 120                 125
Gly Met Val Ala Arg Asp Glu Pro Ser Gly Glu Val Met Glu Asp Leu
    130                 135                 140
Ala Leu Pro Val Ser Ile Ser Val Ile Cys Gly Leu Leu Gly Val Ser
145                 150                 155                 160
Tyr Asp Asp Arg His Leu Phe Arg Asp Phe Ser Glu Ala Leu Val Ser
                165                 170                 175
Ser Ser Leu Gly Pro Ala Glu Val Gln Arg Ala Thr Glu Asp Phe Ser
            180                 185                 190
Ala Tyr Met Ala Asp Leu Val Ala Asp Arg Arg Ala Arg Pro Thr Asp
            195                 200                 205
Asp Phe Leu Ser Thr Met Val Gln Ala Arg Asp Glu Gly Asp Arg Leu
    210                 215                 220
Ser Glu Ala Glu Leu Leu Met Met Gly Ser Gly Leu Leu Ile Ser Gly
225                 230                 235                 240
Tyr Glu Thr Thr Ala Thr Gln Ile Gly Asn Phe Val Leu Leu Leu Leu
                245                 250                 255
```

35

```
Asp Asp Arg Arg Leu Tyr Glu Arg Leu Val Thr Glu Pro Asp Leu Val
        260                 265                 270
Pro Ser Ala Val Glu Glu Leu Leu Arg Phe Thr Pro Leu Ser Thr Leu
        275                 280                 285
Asp Gly Phe Ala Arg Ile Ala Leu Glu Asp Val Glu Ile Gly Gly Thr
        290                 295                 300
Leu Ile Arg Ala Gly Glu Ala Val Ile Thr Ser Ile Ala Ser Ala Asn
305                 310                 315                 320
Leu Asp Asp Thr Ala Phe Pro Gly Ala Ala Ser Leu Asp Leu Ala Arg
        325                 330                 335
Ala Gln Asn Pro His Leu Gly Phe Gly His Gly Ala His Tyr Cys Met
        340                 345                 350
Gly Ala Pro Leu Ala Arg Leu Glu Leu Gln Val Val Leu Ser Thr Leu
        355                 360                 365
Val Glu Arg Leu Pro Glu Leu Arg Leu Ser Val Pro Ala Ser Glu Leu
370                 375                 380
Arg Trp Arg Ala Gly Ser Leu Leu Arg Thr Pro Glu Ala Val Pro Val
385                 390                 395                 400
Thr Trp Gly Gly Ser Ala Ala
                405


<210> 11
<211> 282
<212> PRT
<213> Streptomyces bikiniensis

<400> 11
Met Asn Glu Gly Pro Ala Thr Thr Ala Pro Gly Ser Thr Asn Ala Gly
  1               5                  10                  15
Asp Leu Trp Leu Arg Arg Tyr Arg Pro Val Ala Asp Pro Ala Leu Arg
        20                  25                  30
Leu Val Cys Leu Pro His Ala Gly Gly Ser Ala Ser Ala Phe Leu Pro
        35                  40                  45
Phe Thr Cys Leu Leu Pro Asp Arg Val Glu Val Leu Ala Val Gln Tyr
        50                  55                  60
Pro Gly Arg Gln Asp Arg Arg Leu Glu Pro Phe Val Asp Ser Val Asp
65                  70                  75                  80
Ala Leu Val Thr His Val Ala Gly Ala Leu Gly Pro Trp Leu Asp Arg
                85                  90                  95
Pro Val Ala Leu Phe Gly His Ser Leu Gly Ser Leu Val Ala Phe Glu
        100                 105                 110
Thr Ala Arg Arg Leu Ala Glu Gln Ala Pro Glu Ser Arg Leu Ala His
        115                 120                 125
Leu Phe Val Ser Gly Arg Val Ala Pro Thr Val Ala His Arg Thr Thr
        130                 135                 140
Ala His Leu Leu Ser Asp Asp Arg Leu Val Ala Lys Leu Ala Glu Leu
145                 150                 155                 160
Gln Gly Thr Asp Pro Arg Val Leu Ala Asp Glu Glu Val Leu Arg Met
                165                 170                 175
Ala Leu Pro Ala Ile Arg Asn Asp Tyr Arg Ala Ala Ala Thr Tyr Thr
        180                 185                 190
Trp Arg Pro Gly Ala Pro Leu Ala Cys Pro Ile Thr Val Leu Thr Gly
        195                 200                 205
Ser Ala Asp Pro His Val Pro Thr Asp Gly Ala Leu Ala Trp His Gly
        210                 215                 220
Leu Thr Thr Gly Glu Thr Ala Phe Arg Ser Phe Pro Gly Gly His Phe
```

36

```
225                     230                     235                     240
Tyr Leu Thr Glu Gln Ala Glu Ala Val Cys Arg Thr Ile Arg Thr Ala
                245                     250                     255
Thr Gly Leu Ala Val Gly Arg Pro His Pro Ser Ser Ser Ala Ala Ala
            260                     265                     270
Pro Tyr Asp Arg Glu Ser Val His Asp Val
        275                     280
```

```
<210> 12
<211> 323
<212> PRT
<213> Streptomyces bikiniensis

<400> 12
Met Arg Val Leu Val Thr Gly Ala Ala Gly Phe Ile Gly Ser His Phe
 1                   5                   10                  15
Val Arg Gln Leu Leu Ser Gly Ser Tyr Pro Glu Leu Ala Gly Ala His
            20                  25                  30
Val Leu Ser Leu Asp Lys Leu Thr Tyr Ala Gly Asn Thr Glu Asn Leu
        35                  40                  45
Ala Glu Val Ala Gly His Pro Arg His Thr Phe Leu His Gly Asp Ile
        50                  55                  60
Cys Asp Pro Pro Thr Val Ala Gln Ala Leu Arg Gly Thr Asp Leu Val
65                  70                  75                  80
Val His Phe Ala Ala Glu Ser His Val Asp Arg Ser Ile Thr Asp Ser
                85                  90                  95
Ala Ala Phe Val Thr Thr Asn Val Leu Gly Thr Gln Thr Leu Leu Arg
            100                 105                 110
Ser Ala Leu Glu Ala Gly Val Ser Arg Phe Val His Val Ser Thr Asp
        115                 120                 125
Glu Val Tyr Gly Ser Ile Pro Glu Gly Ser Ser Thr Glu Ala Asp Pro
    130                 135                 140
Leu Asp Pro Asn Ser Pro Tyr Ala Ala Ser Lys Ala Ser Ser Asp Leu
145                 150                 155                 160
Leu Ala Leu Ala Phe His Arg Thr His Gly Leu Asp Val Arg Val Thr
                165                 170                 175
Arg Cys Ser Asn Asn Tyr Gly Pro His Gln His Pro Glu Lys Val Val
            180                 185                 190
Pro Leu Phe Val Thr His Leu Leu Glu Gly Leu Arg Leu Pro Leu Tyr
        195                 200                 205
Gly Asp Gly Leu His Arg Arg Asp Trp Leu His Val Asp Asp His Cys
    210                 215                 220
Arg Gly Ile Ala Met Val Ala Ala Arg Gly Arg Ala Gly Glu Val Tyr
225                 230                 235                 240
Asn Ile Gly Gly Gly Thr Glu Leu Ser Asn Val Asp Leu Thr Arg Arg
                245                 250                 255
Leu Leu Gly Val Phe Gly Ala Asp Trp Ser Val Val Asp Arg Val Pro
            260                 265                 270
Asp Arg Ala Ala His Asp Arg Arg Tyr Cys Val Asp Thr Arg Lys Ile
        275                 280                 285
Thr Glu Glu Leu Gly Trp Ala Pro Arg Val Ala Phe Asp Arg Gly Leu
        290                     295                 300
Ala Glu Thr Val Asp Trp Tyr Arg Asp Asn Gly Thr Trp Trp Lys Ala
305                 310                 315                 320
Leu Thr Pro
```

37

<210> 13
<211> 305
<212> PRT
<213> Streptomyces bikiniensis

<400> 13
Val Phe Glu Thr Pro Leu Lys Arg Pro Gly Val Arg Gly Ile Ile Leu
 1   5   10   15
Ala Gly Gly Ser Ala Thr Arg Leu Gln Pro Leu Thr Gly Ala Leu Ser
                20   25   30
Lys Gln Gln Leu Pro Val Tyr Asp Lys Pro Met Ile Tyr Tyr Pro Leu
        35   40   45
Ser Val Leu Met Leu Ala Gly Ile Gln Asp Ile Leu Ile Ile Ser Ser
        50   55   60
His Gln His Val Glu Thr Phe Gln Val Met Leu Gly Asp Gly Ser Arg
65   70   75   80
Leu Gly Ile Gln Leu Asp Tyr Ala Val Gln Asp Glu Pro Arg Gly Val
                85   90   95
Ala Asp Ala Phe Leu Val Gly Asp Lys His Ile Gly Asn Asp Arg Val
            100   105   110
Ala Leu Ile Leu Gly Asp Asn Val Phe His Gly Pro Gly Phe Ser Thr
            115   120   125
Val Leu Lys His Ser Leu Arg Arg Leu Asp Gly Cys Glu Leu Phe Gly
        130   135   140
Tyr Pro Ser Lys Ser Pro Glu Arg Tyr Gly Val Ala Glu Ile Asp Glu
145   150   155   160
Gln Gly His Leu Leu Ser Leu Glu Glu Lys Pro Ser Arg Pro Arg Ser
                165   170   175
Asn Leu Ala Val Thr Gly Leu Tyr Phe Tyr Asp Asn Asp Val Val Glu
            180   185   190
Leu Ala Lys Asp Leu Lys Pro Ser Ala Arg Gly Glu Leu Glu Ile Thr
        195   200   205
Asp Ile Asn Leu Ser Tyr Leu Glu Gln Gly Arg Ala Arg Leu Thr Gln
        210   215   220
Leu Gly Arg Gly Phe Ala Trp Leu Asp Met Gly Thr His Asp Ser Leu
225   230   235   240
Leu Gln Ala Gly Gln Tyr Val Gln Leu Leu Glu Gln Arg Gln Gly Val
                245   250   255
Arg Ile Ala Cys Leu Glu Glu Ile Ala Leu Arg Met Gly Phe Ile Asp
            260   265   270
Ala Asp Thr Cys Tyr Arg Leu Gly Glu Glu Leu Ser Ala Ser Ser Tyr
        275   280   285
Gly Asp Tyr Leu Met Glu Val Ala Ser Gly Leu Gly Ala Thr Arg Thr
        290   295   300
Gly
305

<210> 14
<211> 196
<212> PRT
<213> Streptomyces bikiniensis

<400> 14
Met His Pro Leu Ser Ile Glu Gly Ala Trp Ser Gln Glu Pro Val Ile

38

```
      1               5                    10                        15
His Ser Asp His Arg Gly Arg Ser His Glu Trp Phe Arg Gly Glu Ser
             20                    25                    30
Phe Arg Gln Ala Phe Gly His Asp Phe Pro Val Ala Gln Val Asn Val
         35                    40                    45
Ala Val Ser His Arg Gly Ala Leu Arg Gly Ile His Tyr Thr Glu Ile
     50                    55                    60
Pro Pro Gly Gln Ala Lys Tyr Ser Val Cys Val Arg Gly Ala Gly Leu
65                    70                    75                    80
Asp Val Val Val Asp Val Arg Ile Gly Ser Pro Thr Phe Gly Arg Trp
                 85                    90                    95
Glu Ile Val Pro Met Asp Ala Glu Arg Asn Thr Ala Val Tyr Leu Thr
                 100                   105                   110
Ala Gly Leu Gly Arg Ala Phe Leu Ser Leu Thr Asp Asp Ala Thr Leu
             115                   120                   125
Val Tyr Leu Cys Ser Ser Gly Tyr Ala Pro Ala Arg Glu His Ser Val
     130                   135                   140
Asn Pro Leu Asp Pro Asp Leu Gly Ile Ala Trp Pro Asp Asp Ile Glu
145                   150                   155                   160
Pro Leu Leu Ser Asp Arg Asp Glu Asn Ala Pro Thr Leu Ala Thr Ala
                 165                   170                   175
Glu Arg Leu Gly Leu Leu Pro Thr Tyr Gln Ala Trp Gln Glu Gln Gln
             180                   185                   190
Gln Ala Gln Arg
             195


<210> 15
<211> 255
<212> PRT
<213> Streptomyces bikiniensis

<400> 15
Met Thr Val Ile Ala Ala Glu Ala Asp Leu Tyr Leu Asp Leu Leu Lys
  1               5                    10                        15
Lys Val Val Thr Asn Met Ile Tyr Glu Asp Gln Thr Asn Val Ala Gly
             20                    25                    30
Leu Ile Thr Ser Ser Ser Tyr Ser Ala Glu Leu Arg Ser Val Gly Glu
         35                    40                    45
Asp Phe Pro Arg Val Ala His Ser Met Val Gly Leu Lys Arg Leu Asp
     50                    55                    60
Asn Leu Gln Lys Cys Leu Glu Asp Val Leu Arg Asp Gly Val Pro Gly
65                    70                    75                    80
Asp Phe Ala Glu Thr Gly Val Trp Arg Gly Gly Ala Cys Ile Phe Ala
                 85                    90                    95
Arg Gly Val Phe Arg Ala His Gly Val Arg Asp Arg Lys Val Trp Val
                 100                   105                   110
Ala Asp Ser Phe Gln Gly Phe Pro Lys Thr Thr Glu Asp Asp His Gln
             115                   120                   125
Leu Asp Val Asp Ile Asp Leu Gly Gln Tyr Asn Asp Val Leu Ser Ile
         130                   135                   140
Pro Val Asp Val Glu Thr Val Lys Gly Asn Phe Ala Arg Tyr Gly Leu
145                   150                   155                   160
Leu Asp Asp Gln Val Arg Phe Leu Pro Gly Trp Phe Lys Asp Thr Met
                 165                   170                   175
Pro Thr Ala Pro Ile Glu Arg Leu Ala Val Leu Arg Leu Asp Gly Asp
             180                   185                   190
```

```
Ser Tyr Ala Ala Thr Arg Glu Val Leu Thr Asn Leu Tyr His Lys Val
        195                 200                 205
Ser Asp Gly Gly Tyr Val Ile Val Asp Asp Tyr Cys Ile Pro Ala Cys
    210                 215                 220
Arg Gln Ala Val His Glu Phe Arg Asp Glu His Gly Ile Thr Asp Glu
225                 230                 235                 240
Ile His Gln Ile Asp Arg Gln Gly Ser Tyr Trp Arg Arg Ser Ser
                245                 250                 255


<210> 16
<211> 420
<212> PRT
<213> Streptomyces bikiniensis

<400> 16
Met Leu Asp Val Asp His Leu Leu Pro Ile Ala Phe Arg Val Arg Lys
  1               5                  10                  15
Ser Met Lys Ser Ser Lys Val Val His Ser Arg Pro Ala Glu Ala Gly
         20                 25                  30
Val Ala Trp Pro Val Ala Arg Thr Cys Pro Phe Thr Leu Pro Asp Gln
         35                 40                  45
Tyr Ala Glu Lys Arg Lys Asn Glu Pro Ile Cys Arg Ala Gln Val Trp
    50                 55                  60
Asp Asp Ser Arg Thr Trp Leu Ile Thr Lys His Glu His Val Arg Ala
65                 70                 75                  80
Leu Leu Ala Asp Pro Arg Val Thr Val Asp Pro Ala Lys Leu Pro Arg
                85                 90                  95
Leu Ser Pro Ser Asp Gly Asp Gly Gly Phe Arg Ser Leu Leu Thr
        100                 105                 110
Met Asp Pro Pro Asp His Asn Ala Leu Arg Arg Met Leu Ile Ser Glu
        115                 120                 125
Phe Ser Val His Arg Val Arg Glu Met Arg Pro Gly Ile Glu Arg Thr
    130                 135                 140
Val His Gly Leu Leu Asp Gly Ile Leu Glu Arg Arg Gly Pro Val Asp
145                 150                 155                 160
Leu Val Ala Glu Leu Ala Leu Pro Met Ser Thr Leu Val Ile Cys Gln
                165                 170                 175
Leu Leu Gly Val Pro Tyr Glu Asp Arg Glu Phe Phe Gln Glu Arg Ser
        180                 185                 190
Glu Gln Ala Thr Arg Val Gly Gly Ser Gln Glu Ser Leu Thr Ala Leu
        195                 200                 205
Leu Glu Leu Arg Asp Tyr Leu Asp Arg Leu Val Thr Ala Lys Ile Glu
    210                 215                 220
Thr Pro Gly Asp Asp Leu Leu Cys Arg Leu Ile Ala Ser Arg Leu His
225                 230                 235                 240
Thr Gly Glu Met Arg His Ala Glu Ile Val Asp Asn Ala Val Leu Leu
                245                 250                 255
Leu Ala Ala Gly His Glu Thr Ser Ala Ala Met Val Ala Leu Gly Ile
        260                 265                 270
Leu Thr Leu Leu Arg His Pro Gly Ala Leu Ala Glu Leu Arg Gly Asp
        275                 280                 285
Gly Thr Leu Met Pro Gln Thr Val Asp Glu Leu Leu Arg Phe His Ser
    290                 295                 300
Ile Ala Asp Gly Leu Arg Arg Ala Val Thr Glu Asp Ile Glu Leu Gly
305                 310                 315                 320
Gly Ile Thr Leu Arg Ala Gly Asp Gly Leu Ile Val Ser Leu Ala Ser
```

40

41

```
Leu Asn Cys Val Arg Asp Phe Gly Val Gly Glu Ala Val Val Met Ser
145                 150                 155                 160
Ser Ser Glu Leu Tyr Cys Ala Pro Pro Thr Ala Ala Ala His Glu Asp
            165                 170                 175
Asp Asp Phe Arg Arg Ser Met Arg Tyr Thr Asp Asn Gly Tyr Val Leu
            180                 185                 190
Ser Lys Thr Tyr Gly Glu Ile Leu Ala Arg Leu His Arg Glu Gln Phe
        195                 200                 205
Gly Thr Asn Val Phe Leu Val Arg Pro Gly Asn Val Tyr Gly Pro Gly
        210                 215                 220
Asp Gly Tyr Asp Pro Ser Arg Gly Arg Val Ile Pro Ser Met Leu Ala
225                 230                 235                 240
Lys Ala Asp Ala Gly Glu Glu Ile Glu Ile Trp Gly Asp Gly Ser Gln
            245                 250                 255
Thr Arg Ser Phe Ile His Val Thr Asp Leu Val Arg Ala Ser Leu Arg
            260                 265                 270
Leu Leu Glu Thr Gly Lys Tyr Pro Glu Met Asn Val Ala Gly Ala Glu
        275                 280                 285
Gln Val Ser Ile Leu Glu Leu Ala Arg Met Val Met Ala Val Leu Gly
        290                 295                 300
Arg Pro Glu Arg Ile Arg Leu Asp Pro Gly Arg Pro Val Gly Ala Pro
305                 310                 315                 320
Ser Arg Leu Leu Asp Leu Thr Arg Met Ser Glu Val Ile Asp Phe Glu
            325                 330                 335
Pro Gln Pro Leu Arg Thr Gly Leu Glu Glu Thr Ala Arg Trp Phe Arg
            340                 345                 350
His His Thr Arg
            355


<210> 19
<211> 326
<212> PRT
<213> Streptomyces Bikiniensis

<400> 19
Val Thr Ala Asp Arg Trp Ala Gly Arg Thr Val Leu Val Thr Gly Ala
  1             5                 10                  15
Leu Gly Phe Ile Gly Ser His Phe Val Arg Gln Leu Glu Ala Arg Gly
            20                  25                  30
Ala Glu Val Leu Ala Leu Tyr Arg Thr Glu Arg Pro Gln Leu Gln Ala
        35                  40                  45
Glu Leu Ala Ala Leu Asp Arg Val Arg Leu Ile Arg Thr Glu Leu Arg
        50                  55                  60
Asp Glu Ser Asp Val Arg Gly Ala Phe Lys Tyr Leu Ala Pro Ser Ile
65                  70                  75                  80
Asp Thr Val Val His Cys Ala Ala Met Asp Gly Asn Ala Gln Phe Lys
                85                  90                  95
Leu Glu Arg Ser Ala Glu Ile Leu Asp Ser Asn Gln Arg Thr Ile Ser
            100                 105                 110
His Leu Leu Asn Cys Val Arg Asp Phe Gly Val Gly Glu Ala Val Val
        115                 120                 125
Met Ser Ser Ser Glu Leu Tyr Cys Ala Pro Pro Thr Ala Ala Ala His
        130                 135                 140
Glu Asp Asp Asp Phe Arg Arg Ser Met Arg Tyr Thr Asp Asn Gly Tyr
145                 150                 155                 160
Val Leu Ser Lys Thr Tyr Gly Glu Ile Leu Ala Arg Leu His Arg Glu
```

```
                        165                    170                     175
Gln Phe Gly Thr Asn Val Phe Leu Val Arg Pro Gly Asn Val Tyr Gly
                180                     185                     190
Pro Gly Asp Gly Tyr Asp Pro Ser Arg Gly Arg Val Ile Pro Ser Met
            195                     200                     205
Leu Ala Lys Ala Asp Ala Gly Glu Glu Ile Glu Ile Trp Gly Asp Gly
        210                     215                     220
Ser Gln Thr Arg Ser Phe Ile His Val Thr Asp Leu Val Arg Ala Ser
225                     230                     235                     240
Leu Arg Leu Leu Glu Thr Gly Lys Tyr Pro Glu Met Asn Val Ala Gly
                245                     250                     255
Ala Glu Gln Val Ser Ile Leu Glu Leu Ala Arg Met Val Met Ala Val
                260                     265                     270
Leu Gly Arg Pro Glu Arg Ile Arg Leu Asp Pro Gly Arg Pro Val Gly
            275                     280                     285
Ala Pro Ser Arg Leu Leu Asp Leu Thr Arg Met Ser Glu Val Ile Asp
        290                     295                     300
Phe Glu Pro Gln Pro Leu Arg Thr Gly Leu Glu Glu Thr Ala Arg Trp
305                     310                     315                     320
Phe Arg His His Thr Arg
                325


<210> 20
<211> 403
<212> PRT
<213> Streptomyces bikiniensis

<400> 20
Val Val Thr His Ala Pro Asn Ser Leu Ile Ser Asp Ile Ile Arg Ala
 1               5                   10                      15
Ser Gly Gly His Asp Ala Asp Leu Lys Asp Leu Ala Ala Arg His Asp
            20                      25                      30
Pro Ala Asp Ile Val Arg Val Leu Leu Asp Glu Ile Thr Ser Arg Cys
            35                      40                      45
Pro Ala Pro Val Asn Asp Val Pro Val Leu Val Glu Leu Ala Val Arg
        50                      55                      60
Ala Gly Asp Arg Leu Phe Pro Thr Tyr Leu Tyr Val Leu Lys Gly Gly
65                      70                      75                      80
Pro Val Arg Leu Ala Ala Lys Asp Glu Ala Phe Val Ala Met Arg Val
                85                      90                      95
Glu Tyr Glu Leu Gly Glu Leu Ala Arg Glu Leu Phe Gly Pro Val Arg
            100                     105                     110
Glu Asn Val Thr Gly Val Arg Gly Thr Thr Leu Phe Pro Tyr Val Gly
            115                     120                     125
Asp Thr Ala Ser Glu Gly Glu Glu Asp Ser Gly Ala Glu His Ile Gly
        130                     135                     140
Thr His Phe Leu Ala Ala Gln Gln Gly Ser Gln Thr Val Leu Ala Gly
145                     150                     155                     160
Cys His Ser His Lys Pro Asp Leu Ser Glu Leu Ser Ser Arg Tyr Leu
                165                     170                     175
Thr Pro Lys Trp Gly Ser Leu His Trp Phe Thr Pro His Tyr Asp Arg
                180                     185                     190
His Phe Arg Ser Tyr Arg Asp Gln Pro Val Arg Val Leu Glu Ile Gly
            195                     200                     205
Ile Gly Gly Tyr Lys His Pro Glu Trp Gly Gly Gly Ser Leu Arg Met
        210                     215                     220
```

43

```
Trp Lys His Phe Phe His Arg Gly Glu Ile Tyr Gly Leu Asp Ile Val
225                 230                 235                 240
Asp Lys Ser His Phe Asp Ala Pro Arg Ile Thr Thr Leu Arg Gly Asp
                245                 250                 255
Gln Ser Asp Pro Asp His Leu Arg Ser Ile Ala Glu Lys Tyr Gly Pro
                260                 265                 270
Phe Asp Ile Val Ile Asp Asp Gly Ser His Ile Asn Asp His Ile Arg
        275                 280                 285
Thr Ser Phe Gln Ala Leu Phe Pro His Val Arg Pro Gly Gly Leu Tyr
        290                 295                 300
Val Ile Glu Asp Leu Trp Thr Ala Tyr Trp Ser Gly Phe Gly Gly Asp
305                 310                 315                 320
Glu Asp Pro Lys Arg Tyr Ser Gly Thr Ser Leu Gly Leu Leu Lys Ser
                325                 330                 335
Leu Val Asp Ser Ile Gln His Glu Glu Leu Pro Glu Ala Gly Asp His
                340                 345                 350
Arg Pro Ser Tyr Ala Asp Gln His Val Val Gly Met His Leu Tyr His
                355                 360                 365
Asn Leu Ala Phe Ile Glu Lys Gly Thr Asn Ala Glu Gly Gly Ile Pro
        370                 375                 380
Pro Trp Ile Pro Arg Asp Phe Glu Thr Leu Val Ala Val Ser Ser Gly
385                 390                 395                 400
Gly His Ala
```

<210> 21
<211> 418
<212> PRT
<213> Streptomyces bikiniensis

<400> 21
```
Met Arg Val Thr Leu Leu Ser Val Gly Ser Arg Gly Asp Val Gln Pro
  1               5                 10                  15
Phe Val Ala Leu Gly Ile Gly Leu Lys Ala Arg Gly His Asp Val Thr
                20                25                  30
Leu Ala Ala Pro Ala Thr Leu Arg Pro Leu Val Glu Arg Ala Gly Leu
        35                40                  45
Thr Tyr Arg Leu Ser Pro Gly Asp Pro Asp Gly Phe Phe Thr Met Pro
    50                55                  60
Glu Val Val Glu Ala Leu Arg Arg Gly Pro Ser Phe Lys Asn Met Leu
65                  70                75                  80
Ala Gly Met Pro Glu Ala Pro Glu Ser Tyr Thr Gln Gln Val Val Asp
                85                90                  95
Ala Ile His Asp Ala Ala Glu Gly Ala Asp Leu Ile Val Asn Ala Pro
            100               105                 110
Leu Thr Leu Ala Ala Ala Tyr Gly His Pro Pro Ala Pro Trp Ala Ser
        115               120                 125
Val Ser Trp Trp Pro Asn Ser Met Thr Ser Ala Phe Pro Ala Val Glu
        130               135                 140
Ser Gly Gln Arg His Leu Gly Pro Leu Thr Ser Leu Tyr Asn Arg Tyr
145               150                 155                 160
Thr His Arg Arg Ala Ala Arg Asp Glu Trp Glu Trp Arg Arg Pro Glu
                165               170                 175
Ile Asp Gly Tyr Arg Arg Arg Leu Gly Leu Arg Pro Phe Gly Asp Glu
            180               185                 190
Ser Pro Phe Leu Arg Leu Gly His Asp Arg Pro Tyr Leu Phe Pro Phe
```

```
              195                     200                     205
Ser Pro Ser Val Leu Pro Lys Pro Arg Asp Trp Pro Arg Gln Ser His
    210                     215                     220
Val Thr Gly Tyr Trp Phe Trp Asp Gln His Gly Glu Pro Pro Ala Glu
225                     230                     235                     240
Leu Glu Ser Phe Leu Glu Asp Gly Glu Pro Pro Val Ala Leu Thr Phe
                245                     250                     255
Gly Ser Thr Trp Ser Leu His Arg Gln Glu Glu Ala Leu Gln Ala Ala
                260                     265                     270
Leu Asp Ala Val Arg Gly Val Gly Arg Arg Leu Val Met Val Asp Gly
    275                     280                     285
Pro Asp Ser Asp Leu Pro Asp Asp Val Leu Arg Leu His Gln Val Asp
    290                     295                     300
Tyr Ala Thr Leu Phe Pro Arg Met Ala Ala Val Ile His His Gly Gly
305                     310                     315                     320
Ala Gly Thr Thr Ala Glu Val Leu Arg Ala Gly Val Pro Gln Val Ile
                325                     330                     335
Val Pro Val Phe Ala Asp His Pro Phe Trp Ala Ala Arg Leu Ser Arg
                340                     345                     350
Thr Gly Val Ala Ala Arg Pro Val Pro Phe Ala Arg Phe Ser Arg Glu
                355                     360                     365
Ala Leu Ala Gln Ser Val Arg Gln Ala Val Thr Asp Pro Ala Met Ala
    370                     375                     380
Gly Arg Ala Arg Arg Leu Gly Glu Arg Val Ser Lys Glu Arg Gly Val
385                     390                     395                     400
Asp Thr Ala Cys Asp Ile Leu Glu Lys Trp Ala Glu Thr Ala Arg Ala
                405                     410                     415
Thr Ala
```

<210> 22
<211> 280
<212> PRT
<213> Streptomyces bikiniensis

<400> 22
```
Met Leu Asn Arg Ile Val Arg Tyr Leu Ala Cys Pro His Cys Gly Ala
  1               5                      10                      15
Ser Leu Ala Gln Gly Asp Arg Ala Leu Phe Cys Pro Ala Gly His Ser
            20                      25                      30
Phe Asp Ile Ala Lys Gln Gly Tyr Val Asn Leu Leu Pro Arg Ala Thr
            35                      40                      45
Lys Leu Arg Ala Asp Thr Lys Glu Met Val Glu Ala Arg Asp Ala Phe
    50                      55                      60
Leu Ser Ala Gly His Tyr Asp Pro Val Met Asp Ala Leu Val Asp Leu
65                      70                      75                      80
Ala Arg Arg Thr Ala Asp Pro Ala Val Pro Gly Cys Val Val Asp Ile
                85                      90                      95
Gly Gly Gly Thr Gly His Tyr His Ala Gly Val Met Glu Ala Phe Pro
            100                     105                     110
Asp Ala Gln Gly Leu Leu Leu Asp Ile Ser Lys Tyr Ala Val Arg Arg
            115                     120                     125
Ala Ala Lys Ala His Pro Arg Ile Ala Ala Ala Val Thr Asp Ala Trp
    130                     135                     140
Gln Thr Leu Pro Leu Arg Asp Ala Ala Ala Gly Met Val Ile Asn Thr
145                     150                     155                     160
```

45

```
Phe Ala Pro Arg Asn Gly Pro Glu Leu His Arg Val Leu His Pro Arg
                165                 170                 175
Gly Val Leu Leu Val Val Thr Pro Leu Pro Asp His Leu Arg Glu Val
            180                 185                 190
Ile Gly Ala Leu Gly Leu Leu Gln Val Asp Glu Gly Lys Glu Ser Arg
        195                 200                 205
Leu Ala Glu Gln Leu Ala Pro His Phe Ser Ala Val Ala Thr Glu Glu
    210                 215                 220
Leu Thr Arg Thr Met Ala Leu Asp His Gln Ala Leu Ala His Leu Val
225                 230                 235                 240
Gly Met Gly Pro Asn Ala Trp His Arg Asp Ala Gln Arg Asp Leu Glu
                245                 250                 255
Thr Ile Gln Arg Leu Pro Ala Pro Thr Arg Val Thr Leu Ser Val Arg
                260                 265                 270
Leu Ser Ala Tyr Arg Leu Ser Ala
            275                 280


<210> 23
<211> 4441
<212> PRT
<213> Streptomyces bikiniensis

<400> 23
Met Arg Ala Pro Tyr Gly Asn Arg Gln Val Asn Arg Arg Phe Leu Arg
 1               5                  10                  15
Glu Phe Arg Ala Lys Arg Pro His Cys Val Ser Pro Leu His Phe Leu
            20                  25                  30
Ala Glu Phe Ser Glu Ser Arg Gln Thr Thr Gly Ser Ala Gly Val Thr
        35                  40                  45
Ala Pro Ile Asp Arg Pro Gly Val Ser Met Ala Pro Lys Ser Gly Ala
    50                  55                  60
Gln Arg Ser Ser Asp Ile Ala Val Val Gly Met Ser Cys Arg Leu Pro
65                  70                  75                  80
Gly Ala Pro Gly Ile Asp Glu Phe Trp His Leu Leu Thr Thr Gly Gly
                85                  90                  95
Ser Ala Ile Glu Arg Arg Ala Asp Gly Thr Trp Arg Gly Ser Leu Asp
            100                 105                 110
Gly Ala Ala Asp Phe Asp Ala Ala Phe Phe Asp Met Thr Pro Arg Gln
        115                 120                 125
Ala Ala Ala Ala Asp Pro Gln Gln Arg Leu Met Leu Glu Leu Gly Trp
    130                 135                 140
Thr Ala Leu Glu Asn Ala Gly Ile Val Pro Gly Ser Leu Ala Gly Thr
145                 150                 155                 160
Asp Thr Gly Val Phe Val Gly Ile Ala Ala Asp Asp Tyr Ala Ala Leu
                165                 170                 175
Leu His Arg Ser Ala Thr Pro Val Ser Gly His Thr Ala Thr Gly Leu
            180                 185                 190
Ser Arg Gly Met Ala Ala Asn Arg Leu Ser Tyr Leu Leu Gly Leu Arg
        195                 200                 205
Gly Pro Ser Leu Ala Val Asp Ser Ala Gln Ser Ser Ser Leu Val Ala
    210                 215                 220
Val His Leu Ala Cys Glu Ser Leu Arg Arg Gly Glu Ser Asp Leu Ala
225                 230                 235                 240
Ile Val Gly Gly Val Ser Leu Ile Leu Ala Glu Asp Ser Thr Ala Gly
                245                 250                 255
Met Glu Leu Met Gly Ala Leu Ser Pro Asp Gly Arg Cys His Thr Phe
```

46

```
                  260                    265                    270
Asp Ala Arg Ala Asn Gly Tyr Val Arg Gly Glu Gly Gly Ala Cys Val
        275                    280                    285
Val Leu Lys Pro Leu Glu Arg Ala Leu Ala Asp Gly Asp Arg Val His
        290                    295                    300
Cys Val Val Arg Gly Ser Ala Val Asn Asn Asp Gly Gly Gly Ser Thr
305                    310                    315                    320
Leu Thr Thr Pro His Arg Glu Ala Gln Ala Ala Val Leu Arg Ala Ala
                325                    330                    335
Tyr Glu Arg Ala Gly Val Gly Pro Asp Gln Val Ser Tyr Val Glu Leu
                340                    345                    350
His Gly Thr Gly Thr Pro Val Gly Asp Pro Val Glu Ala Ala Ala Leu
                355                    360                    365
Gly Ala Val Leu Gly Thr Ala His Gly Arg Asn Ala Pro Leu Ser Val
        370                    375                    380
Gly Ser Val Lys Thr Asn Val Gly His Leu Glu Ala Ala Ala Gly Leu
385                    390                    395                    400
Val Gly Phe Val Lys Ala Ala Leu Cys Val Arg Glu Gly Val Val Pro
                405                    410                    415
Pro Ser Leu Asn His Ala Thr Pro Asn Pro Ala Ile Pro Met Asp Arg
                420                    425                    430
Leu Asn Leu Arg Val Pro Thr Arg Leu Glu Pro Trp Pro His Pro Asp
                435                    440                    445
Asp Arg Ala Thr Gly Arg Leu Arg Leu Ala Gly Val Ser Ser Phe Gly
450                    455                    460
Met Gly Gly Thr Asn Ala His Val Val Val Glu Glu Ala Pro Leu Pro
465                    470                    475                    480
Glu Ala Gly Glu Pro Val Gly Ala Gly Val Pro Leu Ala Val Val Pro
                485                    490                    495
Val Val Val Ser Gly Arg Ser Ala Gly Ala Val Ala Glu Leu Ala Ser
                500                    505                    510
Arg Leu Asn Glu Ser Val Arg Ser Asp Arg Leu Val Asp Val Gly Leu
        515                    520                    525
Ser Ser Val Val Ser Arg Ser Val Phe Glu His Arg Ser Val Val Leu
        530                    535                    540
Ala Gly Asp Ser Ala Glu Leu Ser Ala Gly Leu Asp Ala Leu Ala Ala
545                    550                    555                    560
Asp Gly Val Ser Pro Val Leu Val Ser Gly Val Ala Ser Val Gly Gly
                565                    570                    575
Gly Arg Ser Val Phe Val Phe Pro Gly Ala Gly Val Lys Trp Ala Gly
        580                    585                    590
Met Ala Leu Gly Leu Trp Ala Glu Ser Ala Val Phe Ala Glu Ser Met
        595                    600                    605
Ala Arg Cys Glu Ala Ala Phe Ala Gly Leu Val Glu Trp Arg Leu Ala
        610                    615                    620
Asp Val Leu Gly Asp Gly Ala Ala Leu Glu Arg Glu Asp Val Val Gln
625                    630                    635                    640
Pro Ala Ser Phe Ala Val Met Val Ser Leu Ala Ala Leu Trp Arg Ser
                645                    650                    655
Leu Gly Val Val Pro Asp Ala Val Val Gly His Ser Gln Gly Glu Ile
                660                    665                    670
Ala Ala Ala Val Val Ala Gly Gly Leu Ser Leu Glu Asp Gly Ala Arg
        675                    680                    685
Val Val Val Leu Arg Ala Arg Val Ala Glu Glu Val Leu Ser Gly Gly
        690                    695                    700
Gly Ile Ala Ser Val Arg Leu Ser Arg Ala Glu Val Glu Glu Arg Leu
705                    710                    715                    720
```

47

```
Ala Gly Gly Gly Gly Gly Leu Ser Val Ala Val Val Asn Ala Pro Ser
                725                     730              735
Ser Thr Val Val Ala Gly Glu Leu Gly Asp Leu Asp Arg Phe Val Ala
                740                745                 750
Ala Cys Glu Ala Glu Gly Val Arg Ala Arg Arg Leu Glu Phe Gly Tyr
         755                760                765
Ala Ser His Ser Arg Phe Val Glu Pro Val Arg Glu Arg Leu Leu Glu
     770                775                780
Gly Leu Ala Asp Val Arg Pro Val Arg Gly Arg Ile Pro Phe Tyr Ser
785                790                795                    800
Thr Val Glu Ala Ala Glu Phe Asp Thr Ala Gly Leu Asp Ala Glu Tyr
                805                810                815
Trp Phe Gly Asn Leu Arg Arg Pro Val Arg Phe Gln Glu Thr Val Glu
                820                825                830
Arg Leu Leu Ala Asp Gly Phe Arg Val Phe Val Glu Cys Gly Ala His
                835                840                845
Pro Val Leu Thr Gly Ala Val Gln Glu Thr Ala Glu Thr Ala Gly Arg
     850                855                860
Glu Ile Cys Ser Val Gly Ser Leu Arg Arg Asp Glu Gly Gly Leu Arg
865                870                875                    880
Arg Phe Leu Thr Ser Ala Ala Glu Ala Phe Val Gln Gly Val Glu Val
                885                890                895
Ser Trp Pro Val Leu Phe Asp Gly Thr Gly Ala Arg Thr Val Asp Leu
                900                905                910
Pro Thr Tyr Pro Phe Gln Arg Arg His His Trp Ala Pro Asp Gly Ser
     915                920                925
Ala Ser Ala Ala Pro Thr Arg Asp Ile Arg Pro Asp Glu Thr Ala Ala
     930                935                940
Val Pro Ala Asp Thr Met Asp Leu Ala Gly Gln Leu Arg Ala Asp Val
945                950                955                    960
Ala Ser Leu Pro Thr Thr Glu Gln Ile Ala Arg Leu Leu Asp Gln Val
                965                970                975
Arg Asp Gly Val Ala Thr Val Leu Gly Leu Asp Ala Arg Asp Glu Val
                980                985                990
Arg Ala Glu Ala Thr Phe Lys Glu Leu Gly Val Glu Ser Leu Thr Gly
     995                1000                1005
Val Glu Leu Lys Asn His Leu Arg Ala Arg Thr Gly Leu His Val Pro
     1010                1015                1020
Thr Ser Leu Ile Tyr Asp Cys Pro Thr Pro Leu Ala Ala Ala His Tyr
1025                1030                1035                   1040
Leu Arg Asp Glu Leu Leu Gly Arg Pro Ala Glu Gln Ala Val Val Pro
                1045                1050                1055
Ala Gly Ile Pro Val Asp Glu Pro Ile Ala Ile Val Gly Met Gly Cys
                1060                1065                1070
Arg Leu Pro Gly Gly Val Ser Ser Pro Glu Gly Leu Trp Asp Leu Val
                1075                1080                1085
Ala Ser Gly Val Asp Ala Val Ser Pro Phe Pro Thr Asp Arg Gly Trp
                1090                1095                1100
Asp Val Gly Gly Leu Phe Asp Pro Glu Pro Gly Val Pro Gly Arg Ser
1105                1110                1115                   1120
Tyr Val Arg Glu Gly Gly Phe Leu His Glu Ala Gly Glu Phe Asp Ala
                1125                1130                1135
Gly Phe Phe Gly Ile Ser Pro Arg Glu Ala Leu Ala Met Asp Pro Gln
                1140                1145                1150
Gln Arg Leu Leu Leu Glu Thr Ser Trp Glu Ala Leu Glu Arg Ala Gly
     1155                1160                1165
Ile Asp Pro His Thr Leu Arg Gly Ser Arg Thr Gly Val Tyr Ala Gly
```

48

```
           1170                1175                1180
Val Met Ala Gln Glu Tyr Gly Pro Arg Leu His Glu Gly Ala Asp Gly
1185                1190                1195                1200
Tyr Glu Gly Tyr Leu Leu Thr Gly Ser Ser Ser Ser Val Ala Ser Gly
                1205                1210                1215
Arg Ile Ser Tyr Val Leu Gly Leu Glu Gly Pro Ala Val Thr Val Asp
                1220                1225                1230
Thr Ala Cys Ser Ser Ser Leu Val Ala Leu His Leu Ala Val Arg Ala
           1235                1240                1245
Leu Arg Ser Gly Glu Cys Asp Leu Ala Leu Ala Gly Gly Ala Thr Val
           1250                1255                1260
Met Ala Glu Pro Gly Met Phe Val Glu Phe Ser Arg Gln Arg Gly Leu
1265                1270                1275                1280
Ser Ala His Gly Arg Cys Lys Ala Tyr Ser Asp Ser Ala Asp Gly Thr
                1285                1290                1295
Gly Trp Ala Glu Gly Ala Gly Val Leu Leu Val Glu Arg Leu Ser Asp
                1300                1305                1310
Ala Val Arg His Gly Arg Arg Val Leu Ala Val Val Arg Gly Ser Ala
           1315                1320                1325
Val Asn Gln Asp Gly Ala Ser Asn Gly Leu Thr Ala Pro Asn Gly Arg
           1330                1335                1340
Ser Gln Ser Arg Leu Ile Arg Gln Ala Leu Ala Asp Ala Arg Leu Gly
1345                1350                1355                1360
Val Ala Asp Val Asp Val Val Glu Gly His Gly Thr Gly Thr Arg Leu
                1365                1370                1375
Gly Asp Pro Ile Glu Ala Gln Ala Leu Leu Ala Thr Tyr Gly Gln Arg
                1380                1385                1390
Asp Ala Gly Arg Pro Leu Arg Leu Gly Ser Leu Lys Ser Asn Val Gly
           1395                1400                1405
His Thr Gln Ala Ala Ala Gly Val Ala Gly Val Ile Lys Met Val Met
           1410                1415                1420
Ala Met Arg His Gly Val Leu Pro Lys Thr Leu His Val Asp Glu Pro
1425                1430                1435                1440
Thr Ala Glu Val Asp Trp Ser Ala Gly Ala Val Ser Leu Leu Arg Glu
                1445                1450                1455
Gln Glu Ala Trp Pro Arg Gly Glu Arg Val Arg Arg Ala Gly Val Ser
                1460                1465                1470
Ser Phe Gly Val Ser Gly Thr Asn Ala His Val Val Val Glu Glu Ala
           1475                1480                1485
Pro Val Pro Glu Asp Gly Glu Ala Ile Glu Gly Gly Ala Pro Leu Ala
           1490                1495                1500
Val Val Pro Val Val Val Ser Gly Arg Ser Ala Gly Ala Val Ala Glu
1505                1510                1515                1520
Leu Ala Gly Arg Val Ser Glu Val Ala Gly Ser Gly Arg Leu Val Asp
                1525                1530                1535
Val Gly Leu Ser Ser Val Val Ser Arg Ser Val Phe Glu His Arg Ser
                1540                1545                1550
Val Val Leu Ala Gly Asp Ser Ala Glu Leu Asn Ala Gly Leu Asp Ala
           1555                1560                1565
Leu Ala Ala Asp Gly Val Ser Pro Val Leu Val Ser Gly Val Ala Ser
           1570                1575                1580
Gly Glu Gly Gly Arg Ser Val Phe Val Phe Pro Gly Gln Gly Thr Gln
1585                1590                1595                1600
Trp Ala Gly Met Ala Leu Gly Leu Trp Ala Glu Ser Ala Val Phe Ala
                1605                1610                1615
Glu Ser Met Ala Arg Cys Glu Ala Ala Phe Ala Gly Leu Val Glu Trp
           1620                1625                1630
```

49

```
Arg Leu Ala Asp Val Leu Gly Asp Gly Ser Ala Leu Glu Arg Val Asp
        1635                1640                1645
Val Val Gln Pro Ala Ser Phe Ala Val Met Val Ser Leu Ala Glu Leu
    1650                1655                1660
Trp Arg Ser Leu Gly Val Val Pro Asp Ala Val Val Gly His Ser Gln
1665                1670                1675                1680
Gly Glu Ile Ala Ala Ala Val Val Ala Gly Gly Leu Ser Leu Glu Asp
            1685                1690                1695
Gly Ala Arg Val Val Val Leu Arg Ala Arg Leu Ile Gly Arg Glu Leu
        1700                1705                1710
Ala Gly Arg Gly Gly Met Ala Ser Val Ala Leu Pro Val Ala Val Val
        1715                1720                1725
Glu Glu Arg Leu Ala Gly Trp Ala Gly Arg Leu Gly Val Ala Val Val
    1730                1735                1740
Asn Gly Pro Ser Ala Thr Val Val Ala Gly Asp Val Asp Ala Val Gly
1745                1750                1755                1760
Glu Phe Val Thr Ala Cys Glu Val Glu Gly Val Arg Ala Arg Val Leu
            1765                1770                1775
Pro Val Asp Tyr Ala Ser His Ser Ala His Val Glu Asp Leu Lys Ala
            1780                1785                1790
Glu Leu Glu Gln Ile Leu Ala Gly Ile Gly Pro Val Thr Gly Gly Ile
            1795                1800                1805
Pro Phe Tyr Ser Thr Ser Glu Ala Ala Gln Ile Asp Thr Ala Gly Leu
    1810                1815                1820
Asp Ala Gly Tyr Trp Phe Gly Asn Leu Arg Arg Pro Val Arg Phe Gln
1825                1830                1835                1840
Glu Thr Val Glu Arg Leu Leu Ala Asp Gly Phe Arg Val Phe Val Glu
            1845                1850                1855
Cys Gly Ala His Pro Val Leu Thr Gly Ala Val Gln Glu Thr Ala Glu
            1860                1865                1870
Ser Thr Gly Arg Gln Val Cys Ala Val Gly Ser Leu Arg Arg Asp Glu
            1875                1880                1885
Gly Gly Leu Arg Arg Phe Leu Thr Ser Ala Ala Glu Ala Phe Val Gln
    1890                1895                1900
Gly Val Gly Val Ser Trp Pro Ala Leu Phe Asp Gly Thr Gly Ala Arg
1905                1910                1915                1920
Thr Val Asp Leu Pro Thr Tyr Pro Phe Gln Arg Arg Arg Tyr Trp Leu
            1925                1930                1935
Glu Ser Arg Pro Pro Ala Ala Val Val Pro Ser Gly Val Gln Asp Gly
            1940                1945                1950
Leu Ser Tyr Glu Val Val Trp Lys Ser Leu Pro Val Arg Glu Ser Ser
            1955                1960                1965
Arg Leu Asp Gly Arg Trp Leu Leu Val Val Pro Glu Thr Leu Asp Ala
    1970                1975                1980
Asp Gly Thr Arg Ile Ala His Asp Leu Gln His Ala Leu Thr Thr His
1985                1990                1995                2000
Gly Ala Thr Val Ser Arg Val Ser Val Asp Val Thr Thr Ile Asp Arg
            2005                2010                2015
Ala Asp Leu Ser Ala Arg Leu Thr Thr Ser Ala Ala Glu Asp Gln Glu
            2020                2025                2030
Pro Leu Gly Arg Val Val Ser Leu Leu Gly Trp Ala Glu Gly Val Arg
            2035                2040                2045
Ala His Gly Pro Asn Val Pro Thr Ser Val Ala Ala Ser Leu Ala Leu
    2050                2055                2060
Val Gln Ala Val Gly Asp Ala Gly Phe Gly Val Pro Val Trp Ala Val
2065                2070                2075                2080
Thr Arg Gly Ala Val Ser Val Val Pro Gly Glu Val Pro Glu Thr Ala
```

50

```
                2085                2090                2095
Gly Ala Gln Leu Trp Ala Leu Gly Arg Val Ala Gly Leu Glu Leu Pro
         2100                2105                2110
Asp Arg Trp Gly Gly Leu Ile Asp Leu Pro Ala Asp Ala Asp Ala Arg
         2115                2120                2125
Thr Ala Gly Leu Ala Val Arg Ala Leu Ala Ala Gly Ile Ala Asp Gly
      2130                2135                2140
Glu Asp Gln Val Ala Val Arg Pro Ser Gly Ala Tyr Gly Arg Arg Val
2145                2150                2155                2160
Val Gln Ala Ala His Arg Glu Pro Ser Gly Ala Lys Thr Glu Trp Arg
                2165                2170                2175
Pro Arg Gly Thr Val Leu Val Thr Gly Gly Met Gly Ala Ile Gly Thr
         2180                2185                2190
Arg Val Ala Arg Trp Leu Ala Arg Asn Gly Ala Glu His Leu Val Leu
      2195                2200                2205
Thr Gly Arg Arg Gly Ala Gly Thr Pro Gly Ala Asp Glu Leu Ala Gly
      2210                2215                2220
Glu Leu Arg Ala Ser Gly Val Gln Val Thr Leu Ala Ala Cys Asp Val
2225                2230                2235                2240
Ser Asp Arg Ala Ala Leu Ala Ala Leu Leu Asp Ala His Pro Pro Thr
                2245                2250                2255
Ala Val Phe His Thr Ala Gly Val Leu Asn Asp Gly Thr Val Asp Thr
         2260                2265                2270
Leu Thr Pro Ala His Leu Asp Gly Val Leu Ser Pro Lys Ala Thr Ala
      2275                2280                2285
Ala Val His Leu His Glu Leu Thr Ala His Leu Asp Leu Asp Ala Phe
   2290                2295                2300
Val Leu Phe Ala Ser Val Thr Gly Val Trp Gly Asn Gly Gly Gln Ala
2305                2310                2315                2320
Gly Tyr Ala Met Ala Asn Ala Ala Leu Asp Ala Leu Ala Glu Gln Arg
                2325                2330                2335
Arg Ala Gly Gly Leu Ala Ala Thr Ser Ile Ser Trp Gly Leu Trp Gly
         2340                2345                2350
Gly Gly Gly Met Ala Glu Gly Asp Gly Glu Val Ser Leu Asn Arg Arg
         2355                2360                2365
Gly Ile Arg Ala Leu Glu Pro Ala Thr Gly Ile Glu Ala Leu Gln Arg
      2370                2375                2380

Thr Leu Asp Gln Gly Ala Thr Cys Arg Thr Val Val Asp Val Asp Trp
2385                2390                2395                2400
Gly Gln Phe Ala Pro Arg Thr Ala Ala Leu Arg Arg Gly Arg Leu Phe
         2405                2410                2415
Ala Asp Leu Pro Glu Val Arg Arg Val Leu Glu Ser Glu Gly Val Ala
      2420                2425                2430
Arg Glu Asp Ala Gly Thr Val Glu Pro Gly Ala Val Leu Ala Glu Arg
         2435                2440                2445
Leu Ala Ser Arg Ser Glu Ala Glu Gln Arg Arg Met Leu Val Glu Leu
      2450                2455                2460
Val Arg Ala Glu Ala Ala Ala Val Leu Arg His Asp Thr Thr Asp Leu
2465                2470                2475                2480
Leu Ala Pro Arg Arg Ser Phe Lys Asp Ala Gly Phe Asp Ser Leu Thr
               2485                2490                2495
Ala Leu Glu Leu Arg Asn Arg Leu Asn Thr Ala Thr Gly Val Val Leu
         2500                2505                2510
Pro Val Thr Val Val Phe Asp His Pro Asn Pro Gly Ala Leu Ala Asp
      2515                2520                2525
Phe Leu Tyr Gly Glu Ala Leu Gly Leu Ser Ala Ala Arg Ser Ser Ala
```

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```
      2530                    2535                    2540
Ser Asp Thr Ala Asp Thr Thr Arg Pro Ala Ala Ala Pro Glu Glu Pro
2545                    2550                    2555                    2560
Ile Ala Ile Val Gly Met Ala Cys Arg Tyr Pro Gly Glu Ala Arg Ser
              2565                    2570                    2575
Pro Glu Glu Leu Trp Lys Leu Leu Ile Asp Glu Arg Asp Val Ile Gly
              2580                    2585                    2590
Pro Met Pro Thr Asp Arg Gly Trp Asp Val Gly Gly Leu Phe Asp Pro
         2595                    2600                    2605
Glu Pro Gly Val Pro Gly Arg Ser Tyr Val Arg Glu Gly Gly Phe Leu
         2610                    2615                    2620
His Glu Ala Gly Glu Phe Asp Ala Gly Phe Phe Gly Ile Ser Pro Arg
2625                    2630                    2635                    2640
Glu Ala Leu Ala Met Asp Pro Gln Gln Arg Leu Leu Leu Glu Thr Ser
              2645                    2650                    2655
Trp Glu Ala Leu Glu Arg Ala Gly Ile Asp Pro His Thr Leu Arg Gly
              2660                    2665                    2670
Ser Gln Thr Gly Val Tyr Ala Gly Met Phe His Gln Glu Tyr Ala Thr
         2675                    2680                    2685
Arg Leu His Glu Ala Pro Val Glu Phe Glu Gly His Leu Leu Thr Gly
         2690                    2695                    2700
Thr Ser Gly Ser Val Ala Ser Gly Arg Ile Ser Tyr Val Leu Gly Leu
2705                    2710                    2715                    2720
Glu Gly Pro Ala Val Thr Val Asp Thr Ala Cys Ser Ser Ser Leu Val
              2725                    2730                    2735
Ala Leu His Leu Ala Val Arg Ala Leu Arg Ser Gly Glu Cys Asp Leu
              2740                    2745                    2750
Ala Leu Ala Gly Gly Val Thr Val Met Ala Glu Pro Gly Val Phe Val
         2755                    2760                    2765
Glu Phe Ser Arg Gln Arg Gly Leu Ala Ala Asp Gly Arg Cys Lys Ala
         2770                    2775                    2780
Phe Ala Ala Ala Ala Asp Gly Thr Gly Trp Ala Glu Gly Val Gly Val
2785                    2790                    2795                    2800
Leu Ala Val Glu Arg Leu Ser Asp Ala Val Arg His Gly Arg Arg Val
              2805                    2810                    2815
Leu Ala Val Val Arg Gly Ser Ala Val Asn Gln Asp Gly Ala Ser Asn
         2820                    2825                    2830
Gly Leu Thr Ala Pro Asn Gly Pro Ser Gln Gln Arg Val Ile Arg Gln
         2835                    2840                    2845
Ala Leu Ala Asp Ala Arg Leu Gly Val Ala Asp Val Asp Val Val Glu
         2850                    2855                    2860
Gly His Gly Thr Gly Thr Arg Leu Gly Asp Pro Ile Glu Ala Gln Ala
2865                    2870                    2875                    2880
Leu Leu Ala Thr Tyr Gly Gln Arg Asp Ala Gly Arg Pro Leu Arg Leu
              2885                    2890                    2895
Gly Ser Leu Lys Ser Asn Val Gly His Thr Gln Ala Ala Ala Gly Val
              2900                    2905                    2910
Ala Gly Val Ile Lys Met Val Met Ala Met Arg His Gly Val Leu Pro
         2915                    2920                    2925
Lys Thr Leu His Val Asp Glu Val Ser Pro His Val Asp Trp Ser Ala
         2930                    2935                    2940
Gly Ala Val Ser Leu Leu Thr Glu Gln Glu Pro Trp Pro Arg Gly Glu
2945                    2950                    2955                    2960
Arg Val Arg Arg Ala Gly Val Ser Ala Phe Gly Val Ser Gly Thr Asn
              2965                    2970                    2975
Ala His Val Val Val Glu Glu Ala Pro Ala Ser Glu Ala Pro Val Ala
         2980                    2985                    2990
```

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```
Val Glu Pro Val Glu Pro Gly Ala Val Gly Leu Leu Pro Val Val Pro
        2995                3000                3005
Val Val Val Ser Gly Arg Ser Ala Gly Ala Val Ala Glu Leu Ala Ser
3010                3015                3020
Arg Leu Asn Glu Ser Val Arg Ser Asp Arg Leu Val Asp Val Gly Leu
3025                3030                3035                3040
Ser Ser Val Val Ser Arg Ser Val Phe Glu His Arg Ser Val Val Leu
                3045                3050                3055
Ala Gly Asp Ser Ala Glu Leu Ser Ala Gly Leu Asp Ala Leu Ala Ala
                3060                3065                3070
Asp Gly Val Ser Pro Val Leu Val Ser Gly Val Ala Ser Val Gly Gly
        3075                3080                3085
Gly Arg Ser Val Phe Val Phe Pro Gly Ala Gly Val Lys Trp Ala Gly
        3090                3095                3100
Met Ala Leu Gly Leu Trp Ala Glu Ser Ala Val Phe Ala Glu Ser Met
3105                3110                3115                3120
Ala Arg Cys Glu Ala Ala Phe Ala Gly Leu Val Glu Trp Arg Leu Ala
                3125                3130                3135
Asp Val Leu Gly Asp Gly Ala Ala Leu Glu Arg Glu Asp Val Val Gln
                3140                3145                3150
Pro Ala Ser Phe Ala Val Met Val Ser Leu Ala Ala Leu Trp Arg Ser
        3155                3160                3165
Leu Gly Val Val Pro Asp Ala Val Val Gly His Ser Gln Gly Glu Ile
        3170                3175                3180
Ala Ala Ala Val Val Ala Gly Gly Leu Ser Leu Glu Asp Gly Ala Arg
3185                3190                3195                3200
Val Val Val Leu Arg Ala Arg Val Ala Glu Glu Val Leu Ser Gly Gly
                3205                3210                3215
Gly Ile Ala Ser Val Arg Leu Ser Arg Ala Glu Val Glu Glu Arg Leu
        3220                3225                3230
Ala Gly Gly Gly Gly Gly Leu Ser Val Ala Val Val Asn Ala Pro Ser
        3235                3240                3245
Ser Thr Val Val Ala Gly Glu Leu Gly Glu Leu Asp Arg Phe Val Ala
        3250                3255                3260
Ala Cys Glu Ala Glu Gly Val Arg Ala Arg Arg Leu Glu Phe Gly Tyr
3265                3270                3275                3280
Ala Ser His Ser Arg Phe Val Glu Pro Val Arg Glu Arg Leu Leu Glu
                3285                3290                3295
Gly Leu Ala Asp Val Arg Pro Val Arg Gly Arg Ile Pro Phe Tyr Ser
        3300                3305                3310
Thr Val Glu Ala Gly Glu Phe Asp Thr Ala Gly Leu Asp Ala Glu Tyr
        3315                3320                3325
Trp Phe Gly Asn Leu Arg Arg Pro Val Arg Phe Gln Glu Thr Val Glu
        3330                3335                3340
Arg Leu Leu Ala Asp Gly Phe Arg Val Phe Val Glu Cys Gly Ala His
3345                3350                3355                3360
Pro Val Leu Thr Gly Ala Val Gln Glu Thr Ala Glu Thr Ala Gly Arg
                3365                3370                3375
Glu Val Cys Ala Val Gly Ser Leu Arg Arg Asp Glu Gly Gly Leu Arg
                3380                3385                3390
Arg Phe Leu Thr Ser Ala Ala Glu Ala Phe Val Gln Gly Val Glu Val
        3395                3400                3405
Ser Trp Pro Val Leu Phe Asp Gly Thr Gly Ala Arg Thr Val Asp Leu
        3410                3415                3420
Pro Thr Tyr Pro Phe Gln Arg Arg His Tyr Trp Ala Gln Ser Ser Pro
3425                3430                3435                3440
Ala Gly Ala Gly Ser Ser Ala Ala Ala Arg Phe Gly Met Thr Trp Glu
```

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```
                    3445                3450                3455
Glu His Pro Leu Leu Gly Gly Ala Leu Pro Leu Ala Asp Ser Gly Glu
          3460                3465                3470
Leu Leu Leu Val Gly Arg Ile Ser Pro Ala Ser His Ser Trp Ile Ala
      3475                3480                3485
Asp His Thr Val Ala Gly Thr Ala Leu Leu Pro Gly Thr Ala Phe Val
      3490                3495                3500
Asp Met Ala Leu His Ala Ala Ala Val Ala Gly Cys Ala Gly Val Glu
3505                3510                3515                3520
Glu Leu Ser Ile Glu Ala Pro Leu Pro Val His Gly Gly Ile Arg Leu
              3525                3530                3535
Gln Val Val Ile Asp Glu Pro Asp Ser Ser Ala Arg Arg Arg Val Ser
          3540                3545                3550
Val Phe Ala Arg Pro Glu Glu Glu Asp Gly Asp Ala Gly Arg Trp Thr
      3555                3560                3565
Arg His Ala Thr Gly Val Leu Thr Pro Asp Val Ala Pro Glu Pro Gly
      3570                3575                3580
Arg Pro Gln Trp Cys Arg Gln Ala Trp Pro Pro Ser Gly Ser Val Arg
3585                3590                3595                3600
Val Glu Ala Ser Glu Leu Tyr Asp Arg Phe Ser Ala Leu Gly Tyr Asp
              3605                3610                3615
Tyr Gly Glu Val Phe Ala Gly Val Glu Ala Val Trp Leu Arg Glu Gly
          3620                3625                3630
Glu Ala Phe Ala Glu Val Arg Leu Pro Thr Gly Ala Ala Pro Asp Ala
          3635                3640                3645
Glu Arg Phe Gly Val His Pro Gly Leu Leu Asp Ala Ala Leu His Pro
      3650                3655                3660
Trp Leu Leu Gly Asp Phe Leu Ser Arg Pro Asp Gly Gly Ser Val Leu
3665                3670                3675                3680
Leu Pro Phe Ala Trp Arg Gly Ile Thr Leu His Thr Ala Gly Ala Asp
              3685                3690                3695
Ala Leu Arg Val Arg Leu Gly Pro Ala Gly Glu Gly Ala Leu Ser Leu
          3700                3705                3710
Glu Ala Val Asp Leu Ser Gly Ala Pro Val Leu Ser Met Asp Ala Leu
      3715                3720                3725
Val Leu Arg Pro Leu Ala Gln Asp Arg Leu Ala Glu Leu Val Gly Gly
      3730                3735                3740
Thr Thr Ser Thr Pro Leu Tyr Arg Val Asp Trp Gln Arg Ser Pro Ile
3745                3750                3755                3760
Ala Arg Thr Ala Pro Ser Ala Thr Gly Leu Phe Gly Ser Leu Pro Ser
              3765                3770                3775
Gly Ala Val Arg Arg Trp Ala Val Val Gly Gln Gly Gly Val Ala Ala
          3780                3785                3790
Arg Tyr Ala Thr Ala Glu Pro Gly Thr Gly Cys Val Gly Val Phe Pro
          3795                3800                3805
Asp Leu Asp Ala Leu Arg Thr Thr Leu Asp Ser Gly Ala Asp Gly Pro
      3810                3815                3820
Asp Ile Val Leu Ala Asp Phe Gly Ala Arg Pro Gly Asp Ala Ala Pro
3825                3830                3835                3840
His Gly Thr Asp Pro Ala Asp Gly Ala Arg Asp Thr Val Arg Arg Gly
              3845                3850                3855
Leu Ala Leu Ile Gln Gly Trp Leu Ser Asp Glu Arg Phe Ala Ala Ala
          3860                3865                3870
Arg Leu Ala Val Leu Thr Glu His Ala Val Ala Thr Glu Ala Asp Thr
          3875                3880                3885
Arg Arg Thr Asp Leu Ala Gly Ser Ala Leu Trp Gly Leu Met Arg Ser
      3890                3895                3900
```

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```
Ala Gln Thr Glu His Pro Asp Arg Phe Val Leu Val Asp His Asp Gly
3905                3910                3915                3920
Gln Asp Ala Ser Tyr Arg Thr Leu Pro Thr Ala Leu Asp Ser Glu Ile
            3925                3930                3935
Pro Gln Leu Ala Leu Arg Ala Gly Glu Thr Leu Ala Pro Glu Leu Ala
            3940                3945                3950
Val Leu Pro Ser Pro Ala Asp Gly Gly Pro Ala Thr Ser Ala Ala Phe
            3955                3960                3965
Asp Pro Glu Gly Thr Val Leu Val Thr Gly Ala Thr Gly Thr Leu Gly
            3970                3975                3980
Ser Leu Leu Ala Arg His Leu Val Thr Ala His Gly Val Arg His Leu
3985                3990                3995                4000
Leu Leu Leu Ser Arg Ser Gly Arg Glu Ala Ala Gly Ala Ala Glu Leu
            4005                4010                4015
Glu Arg Glu Leu Arg Gln Arg Gly Ala Glu Phe Gln Leu Leu Ser Cys
            4020                4025                4030
Asp Ala Thr Asp Arg Ala Ala Leu Lys Glu Ala Leu Ala Thr Val Pro
            4035                4040                4045
Ala Ala His Pro Leu Thr Ala Val Ile His Thr Ala Gly Val Leu Asp
      4050                4055                4060
Asp Gly Val Val Glu Ala Leu Thr Pro Glu Arg Leu Asp Arg Val Leu
4065                4070                4075                4080
Arg Pro Lys Ala Asp Ala Ala Leu Asn Leu His Asp Leu Thr Glu Gly
            4085                4090                4095
Met Pro Leu Lys Ala Phe Val Leu Tyr Ser Gly Ala Val Gly Leu Leu
            4100                4105                4110
Gly Gly Ala Gly Gln Ala Asn Tyr Ala Ala Ala Asn Ala Phe Leu Asp
            4115                4120                4125
Gly Leu Ala Gln His Arg His Ala Gln Gly Leu Pro Ala Val Ser Leu
      4130                4135                4140
Ala Trp Gly Leu Trp Ser Ala Thr Ser Thr Phe Thr Asp His Leu Gly
4145                4150                4155                4160
Glu Val Asp Leu Arg Arg Met Glu Arg Ser Gly Ile Thr Pro Leu Thr
            4165                4170                4175
Asp Glu Gln Gly Leu Asp Leu Phe Asp Arg Ala Leu Gly Ala Ala Val
            4180                4185                4190
Asp Ala Pro Gln Leu Cys Val Met Gly Leu Asp Thr Ala Ala Leu Arg
      4195                4200                4205
Arg Gln Ala Ala Glu His Gly Pro Thr Ser Met Pro Pro Leu Leu Arg
      4210                4215                4220
Thr Leu Ala Ala Pro Pro Val Arg Arg Gly Ala Gly Arg Ser Gly Arg
4225                4230                4235                4240
Gly Gly Arg Ala Ala Ser Ala Thr Asp Ala Pro Ser Arg Ala Gln Ala
            4245                4250                4255
Leu Arg Glu Arg Leu Thr Gly Leu Asp Ala Ala Ala Arg Arg Asp Glu
            4260                4265                4270
Leu Leu Val Leu Ser Gln Ala Gln Leu Ala Asp Val Leu Gly Phe Ala
            4275                4280                4285
Asp Lys Thr Ala Val Asp Pro Val Arg Ser Phe Arg Glu Ile Gly Leu
      4290                4295                4300
Asp Ser Leu Thr Ala Val Glu Leu Arg Asn Arg Leu Gly Val Val Thr
4305                4310                4315                4320
Gly Leu Arg Leu Pro Pro Ala Leu Val Phe Asp His Pro Asn Leu Asp
            4325                4330                4335
Ala Leu Ala Ala His Leu Ala Glu Leu Leu Ala Ala Glu Gly Arg Asp
      4340                4345                4350
Asp Ala Gly Ala Ala Ala Leu Ser Gly Ile Asp Ala Leu Asp Arg Ala
```

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```
            4355                  4360                  4365
Val Arg Glu Met Ala Ala Asp Asp Thr Arg Arg Asp Ala Val Arg Arg
    4370                  4375                  4380
Arg Leu Ala Glu Leu Leu Ala Val Val Gly Asp Ala Pro Arg Asp Gly
4385                  4390                  4395                  4400
Gly Arg Ala Pro Arg Ala Ala Ala Asp Ala Gly Gly Arg Asp Ala Gln
                 4405                  4410                  4415
Ala Asp Pro Asp Leu Leu Gly Arg Leu Asp Ser Ala Ser Asp Asp Asp
                 4420                  4425                  4430
Leu Phe Ala Phe Ile Glu Asp Gln Leu
         4435                  4440
```

<210> 24
<211> 1974
<212> PRT
<213> Streptomyces bikiniensis

<400> 24

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Met Thr Ala Asn Asp Asp Lys Ile Arg Asp Tyr Leu Lys Arg Val Val
  1               5                  10                  15
Ala Glu Leu His Ser Thr Arg Gln Arg Leu Asn Ala Leu Glu His Asp
             20                  25                  30
Ala Arg Glu Pro Ile Ala Ile Val Gly Met Ser Cys Arg Leu Pro Gly
         35                  40                  45
Gly Val Thr Thr Pro Glu Ser Leu Trp Arg Leu Val Asp Ser Gly Thr
    50                  55                  60
Asp Ala Ala Ser Pro Phe Pro Asp Asp Arg Gly Trp Asp Leu Asp Ala
65                  70                  75                  80
Leu His His Pro Glu Ser Gly Ala Val His Ser Arg Glu Gly Gly Phe
             85                  90                  95
Leu His Asp Ser Ala Asp Phe Asp Ala Glu Phe Phe Gly Ile Ser Pro
             100                 105                 110
Arg Glu Ala Leu Ala Met Asp Pro Gln Gln Arg Leu Leu Leu Glu Thr
         115                 120                 125
Ala Trp Glu Val Phe Glu Arg Ala Gly Ile Asp Pro Val Ser Ala Arg
    130                 135                 140
Gly Ser Arg Thr Gly Val Tyr Ala Gly Val Met Tyr His Asp Tyr Gly
145                 150                 155                 160
Ala Arg Leu Asn Glu Ile Pro Pro Gly Leu Glu Gly Tyr Leu Val Asn
             165                 170                 175
Gly Ser Ala Gly Ser Ile Ala Ser Gly Arg Val Ala Tyr Thr Leu Gly
         180                 185                 190
Leu Glu Gly Pro Ala Val Thr Val Asp Thr Ala Cys Ser Ser Ser Leu
         195                 200                 205
Val Ala Val His Leu Ala Ala Gln Ala Leu Arg Arg Arg Glu Cys Asp
    210                 215                 220
Met Ala Leu Ala Gly Gly Ala Thr Val Leu Ser Thr Pro Asp Leu Phe
225                 230                 235                 240
Ile Asp Phe Ala Arg Leu Gly Gly Leu Ala Ser Asp Gly Arg Cys Lys
             245                 250                 255
Ala Phe Ser Asp Ala Ala Asp Gly Thr Ser Phe Ala Glu Gly Ala Gly
             260                 265                 270
Leu Leu Leu Leu Met Arg Leu Ser Asp Ala Val Ala Glu Gly His Thr
         275                 280                 285
Val Leu Ala Val Val Arg Gly Ser Ala Val Asn Gln Asp Gly Ala Ser
    290                 295                 300
```

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```
Asn Gly Leu Thr Ala Pro Asn Gly Leu Ala Gln Gln Arg Val Ile Arg
305                 310                 315                 320
Glu Ala Leu Ala Asp Ala Asp Leu Asp Pro Asp Gln Ile Asp Ala Val
                325                 330                 335
Glu Ala His Gly Thr Gly Thr Arg Leu Gly Asp Pro Ile Glu Ala Gln
            340                 345                 350
Ala Leu Leu His Thr Tyr Gly Thr Ser Arg Ser Pro Glu Arg Pro Leu
            355                 360                 365
Trp Leu Gly Ser Leu Lys Ser Asn Ile Gly His Thr Gln Ala Ala Ala
    370                 375                 380
Gly Val Ala Gly Val Ile Lys Thr Val Leu Ala Met Arg His Gly Arg
385                 390                 395                 400
Leu Pro Arg Thr Leu His Val Thr Arg Pro Ser Ser Arg Val Glu Trp
                405                 410                 415
Ser Ala Gly Ala Val Glu Leu Leu Thr Arg Ala Gln Asp Trp Pro Gly
                420                 425                 430
Gln Gly Asn Ala Pro Arg Arg Ala Gly Val Ser Ser Phe Gly Ala Ser
            435                 440                 445
Gly Thr Asn Ala His Leu Ile Leu Glu Gly Val Pro Asp Gly Asp Ile
    450                 455                 460
Thr Val Ala Glu Thr Arg Pro Ala Thr Gly Gly Gly Ala Trp Pro Leu
465                 470                 475                 480
Ala Gly Arg Thr Glu Ala Ala Leu Arg Ala Gln Ala Arg Arg Leu His
            485                 490                 495
Asp His Leu Ala Ala Arg Pro His Val Ser Pro Ala Ala Val Gly Arg
            500                 505                 510
Thr Leu Val Arg Ser Arg Thr Ala Phe Glu His Arg Ala Val Val Leu
            515                 520                 525
Gly Gln Asp Thr Ala Asp Leu Leu Ser Gly Leu Ala Glu Leu Ala Ser
    530                 535                 540
Gly Gly Ala His Gly Pro Gly Val Ile Thr Gly Arg Ala Ala Arg Gly
545                 550                 555                 560
Arg Arg Thr Ala Leu Leu Phe Thr Gly Gln Gly Ser Gln Arg Pro Gly
                565                 570                 575
Ala Gly Arg His Leu Tyr Glu Arg Tyr Glu Val Phe Ala Arg Ala Leu
            580                 585                 590
Asp Glu Thr Ala Ala Ala Leu Asp Arg His Leu Asp Arg Pro Leu Arg
            595                 600                 605
Asp Val Met Phe Ala Glu Pro Gly Gly Ala Thr Ala Gly Leu Leu Asp
    610                 615                 620
Arg Thr Glu Tyr Thr Gln Pro Ala Leu Phe Ala Leu Glu Val Ala Leu
625                 630                 635                 640
Phe Arg Leu Val Thr Ala Gly Gly Leu Arg Pro Asp Ala Leu Leu Gly
                645                 650                 655
His Ser Val Gly Glu Leu Ala Ala Ala His Val Ala Gly Val Phe Thr
            660                 665                 670
Leu Pro Asp Ala Ala Arg Leu Val Thr Ala Arg Gly Arg Leu Met Gly
            675                 680                 685
Glu Leu Pro Ala Gly Gly Ala Met Met Ala Ile Gln Ala Ser Gly Pro
            690                 695                 700
Glu Ile Glu Glu Thr Ile Thr Ala Leu Ala Ala His Arg Ser Ala Arg
705                 710                 715                 720
Val Ala Val Ala Ala Leu Asn Gly Pro Asp Ala Thr Val Ile Ser Gly
                725                 730                 735
Asp Glu Asp Val Val Ala Glu Leu Ala Thr Leu Trp Arg Glu Arg Gly
            740                 745                 750
Arg Arg Thr Arg Ala Leu Pro Val Ser His Ala Phe His Ser Pro His
```

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```
          755                      760                      765
Met Asp Ala Ala Leu Glu Pro Phe Ala Arg Ile Ala Arg Asp Val Ser
      770                      775                      780
Tyr Ala Glu Pro Arg Ile Pro Val Val Ser Asn Leu Thr Gly Gly Ile
785                      790                      795                      800
Ala Ser Ala Thr Thr Leu Cys Ala Pro Glu Tyr Trp Val Arg His Ala
                  805                      810                      815
Arg Glu Ala Val Arg Phe Ser Asp Gly Phe Arg Ala Leu Arg Asp Gln
              820                      825                      830
Gly Ile Asp Thr Phe Ile Glu Leu Gly Pro Asp Gly Val Leu Ser Ala
              835                      840                      845
Leu Gly Arg Asp Cys Leu Arg Glu Glu Glu Gly Asp Ala Pro Arg Gln
          850                      855                      860
Asp Gly Ser Ala Asp Pro Asp Thr Thr Gly Ser Arg Ala Asp Gly Gly
865                      870                      875                      880
Arg Arg Pro Val Leu Thr Val Pro Leu Leu Arg Arg Asp Arg Asp Glu
                  885                      890                      895
Thr Thr Thr Cys Leu Gly Ala Leu Ala Thr Val His Thr His Gly Val
              900                      905                      910
Pro Val Asp Leu Ala Ala Val His Gly Ala Pro Glu Gly Pro Ala Val
              915                      920                      925
Glu Leu Pro Thr Tyr Ala Phe Gln Arg Thr Arg Tyr Trp Leu Asp Ala
          930                      935                      940
Pro Ala Pro Ala Ala Gly Pro Thr Ala Thr Gly Leu Glu Ala Thr Asp
945                      950                      955                      960
Gln Pro Leu Leu Pro Ala Val Ile Asp Leu Pro Asp Gly Glu Gly Thr
                  965                      970                      975
Val Arg Thr Gly Leu Leu Ser Leu Arg Thr His Pro Trp Ile Ala Asp
              980                      985                      990
His Arg Val Arg Asp His Ala Val Val Pro Gly Ala Ala Leu Leu Asp
          995                      1000                     1005
Val Ala Ala Trp Ala Gly Thr Glu Ala Gly Cys Pro Arg Val Ala Glu
      1010                     1015                     1020
Leu Thr Phe Ala Thr Pro Leu Val Leu Pro Glu Asn Gly Glu Gly Val
1025                     1030                     1035                     1040
Arg Leu Arg Val Thr Val Ser Gly Pro Asp Ala Glu Gly Ile Arg Ser
                  1045                     1050                     1055
Leu Arg Ile Asp Ser Arg Pro Ala Asp Thr Val Arg Thr Ala Asp Ala
              1060                     1065                     1070
Pro Ser Asp Trp Thr Arg His Ala Ser Gly Thr Leu Val Pro Ala Pro
          1075                     1080                     1085
Glu Glu Ala Gly Asp Gly Thr Gly Val Pro Thr Glu Leu Leu Gly Ala
      1090                     1095                     1100
Trp Pro Pro Ala Asp Ala Thr Pro Val Ala Leu Asp Ala Asp Ala Val
1105                     1110                     1115                     1120
Ala Ala Glu Tyr Gln Arg Leu Ala Ala Gly Gly Val Thr Tyr Gly Pro
                  1125                     1130                     1135
Ala Phe Arg Ala Leu Arg Ala Val Trp Arg Arg Gly Ala Glu Val Phe
              1140                     1145                     1150
Ala Glu Val Arg Leu Pro Gly Gln Ala Ala Ala Asp Ala Ser Arg Tyr
          1155                     1160                     1165
Gly Met His Pro Ala Leu Leu Asp Ala Leu Thr His Ala Thr Gly Phe
      1170                     1175                     1180
Gly Glu Arg Ser Thr Glu Ala Arg Gly Leu Val Pro Phe Ala Trp Ser
1185                     1190                     1195                     1200
Asp Val Arg Ile His Val Arg Gly Ala Asp Ser Leu Arg Val Arg Ile
```

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Ala Pro Ala Gly Pro Asp Ala Val Thr Val Ala Ala Val Asp Pro Thr
                1220   1225   1230
Gly Arg Pro Val Leu Ala Ala Arg Ser Leu Thr Leu Arg Pro Leu Ala
                1235   1240   1245
Glu Ser Arg Phe Gln Asp Pro Glu Ala Asp Ser Thr Pro Leu Tyr Arg
        1250   1255   1260
Leu Glu Trp Thr Pro Ala Pro Gly Ser Val Thr Gly His Ala Gly Pro
1265   1270   1275   1280
Arg Gln Ala Ala Ala Glu Trp Gly Val Leu Gly Asp Pro Val Gln Ala
                1285   1290   1295
Leu Leu Asp Ala Val Arg Asp Gly Ala Glu Ala Pro Val Arg Thr His
                1300   1305   1310
Asp Asp Leu Leu Ala Leu Ala Ala Ser Asp Thr Ala Pro Pro Asp His
                1315   1320   1325
Val Leu Ala Leu Leu Gly His Asp Gly Asp Ala Leu Ala Thr Gly Ala
        1330   1335   1340
His Asp Leu Ala Ala Arg Ala Leu Ala Leu Val Gln Gly Trp Leu Thr
1345   1350   1355   1360
His Ala Arg Phe Ala Asp Ala Arg Leu Val Val Leu Thr Gln Gly Ala
                1365   1370   1375
Val Thr Ala Gly Thr Ser Pro Val His Pro Ala Ala Ala Ala Ala Trp
                1380   1385   1390
Gly Leu Leu Arg Ser Ala Gln Ser Glu His Pro Gly Arg Phe Val Leu
        1395   1400   1405
Val Asp Ala Asp Pro Ala Asp Pro Ala Ala Ser Tyr Arg Ser Leu Pro
        1410   1415   1420
Arg Ala Val Ala Ser Gly Ala Ser Gln Leu Ala Leu Arg Gly Ala Glu
1425   1430   1435   1440
Ile Leu Val Pro Arg Leu Ala Arg Gly Thr Asp Arg Gln Ala Thr Val
                1445   1450   1455
Pro Gly His Pro Gly Asp Val Thr Ala Pro Glu Thr Thr Ala Ala Pro
        1460   1465   1470
Glu Pro Ala Pro Ser Gly Thr Pro Ser Gly Pro Trp Pro Ala Asp Gly
        1475   1480   1485
Thr Val Leu Val Thr Gly Gly Thr Gly Thr Leu Gly Lys Ala Val Ala
        1490   1495   1500
Arg His Leu Val Thr Lys His Gly Val Arg His Leu Ile Leu Ala Gly
1505   1510   1515   1520
Arg Arg Gly Ala Asp Thr Pro Gly Ala Ala Asp Leu Ala Thr Glu Leu
                1525   1530   1535
Thr Gly Leu Gly Ala Thr Val Asn Ile Val Arg Cys Asp Ala Ala Asp
        1540   1545   1550
Arg Ser Ala Leu Glu Gly Val Leu Ala Ala Val Pro Ala Ala His Pro
        1555   1560   1565
Leu Thr Ala Val Val His Thr Ala Gly Val Leu Asp Asp Gly Ile Val
        1570   1575   1580
Thr Ala Gln Thr Pro Arg Arg Leu Ser Ala Val Leu Arg Ala Lys Ala
1585   1590   1595   1600
Asp Ala Val Ser His Leu His Glu Leu Thr Arg Asp Leu Asp Leu Ser
                1605   1610   1615
Ala Phe Val Leu Phe Ser Ser Ala Ala Gly Thr Leu Gly Ser Pro Gly
        1620   1625   1630
Gln Ser Gly Tyr Ala Ala Ala Asn Ser Phe Leu Asp Ala Phe Ala Ala
        1635   1640   1645
Trp Arg Arg Ala Gln Gly Leu Pro Ala Val Ser Leu Ala Trp Gly Leu

```
        1650                1655                 1660
Trp Gly Asp Gly Gly Asp Gly Arg Asp Gly Gly Gly Ser Ala Ala Asp
1665                1670                 1675                 1680
Gly Met Gly Ala Ser Leu Ala Ala Ala Asp Leu Ala Arg Leu Arg Arg
                1685                 1690                 1695
Ser Gly Ile Leu Pro Leu Asp Pro Ala Glu Ala Leu Arg Leu Phe Asp
            1700                 1705                 1710
Glu Ala Cys Asp Pro Ala Arg Thr Glu Ala Val Leu Leu Pro Ile Arg
        1715                 1720                 1725
Leu Asp Leu Thr Gly Leu Arg Ala Arg Ser Ala Arg Gly Ala Val His
        1730                 1735                 1740
Ala Ser Val Val Pro Glu Val Leu His Thr Leu Val Pro Pro Pro Ala
1745                 1750                 1755                 1760
Gly Ala Gly Ser Pro Ala Gly Ala Asp Ala Ser Asp Pro Ala Ala Gly
                1765                 1770                 1775
Gln Ala Pro Pro Ala Pro Ala Ser Asp Thr Leu Ala Glu Arg Leu Ala
            1780                 1785                 1790
Gly Lys Pro Arg Gly Glu Arg Leu Thr Ala Leu Thr Glu Leu Val Arg
        1795                 1800                 1805
Thr Glu Ile Ala Ser Val Leu Gly His Pro Asp Ser Gly Arg Val Gln
        1810                 1815                 1820
Leu Gln Ser Ser Phe Lys Glu Ser Gly Phe Asp Ser Leu Thr Ala Val
1825                 1830                 1835                 1840
Glu Leu Arg Asn Arg Leu Thr Ala Ala Thr Gly Thr Lys Leu Pro Ala
                1845                 1850                 1855
Thr Leu Val Phe Asp His Pro Thr Pro Ala Ala Leu Val Asp His Leu
            1860                 1865                 1870
Glu Gln Glu Leu Pro Lys Ala Ala Gln Glu Ile Pro Ala Asp Leu Pro
        1875                 1880                 1885
Ala Val Leu Asp Ala Leu Asp Arg Ile Arg Asp Gly Leu Ala Thr Ala
        1890                 1895                 1900
Ala Thr Asp Asp Ser Ser Arg Asp His Ile Ala Glu Arg Leu Gln Ala
1905                 1910                 1915                 1920
Leu Leu Gly Thr Leu Thr Ser Ala Ala Gly Val Ser Arg Pro Thr Gly
                1925                 1930                 1935
Ser Pro Gly Glu His Asp Arg Gln Gly Pro Asp Glu Leu Ser Leu Gly
            1940                 1945                 1950
Gln Arg Leu Ala Ala Ser Ser Asp Asp Glu Leu Phe Asp Leu Phe Asp
        1955                 1960                 1965
Ser Asp Phe Arg Ser Thr
    1970
```

<210> 25
<211> 3788
<212> PRT
<213> Streptomyces bikiniensis

<400> 25
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Met Ser Ser Thr Ser Pro Ala Thr Asn Glu Glu Lys Leu Arg Asp Tyr
 1               5                  10                  15
Leu Arg Arg Ala Met Thr Asp Leu His Glu Ala Arg Glu Gln Ile Arg
            20                  25                  30
Arg Thr Glu Ser Ala Arg His Glu Pro Ile Ala Ile Val Gly Met Gly
        35                  40                  45
Cys Arg Leu Pro Gly Gly Val Ser Ser Pro Glu Gly Leu Trp Asp Leu
    50                  55                  60
```

60

```
Val Ala Ser Gly Val Asp Ala Val Ser Pro Phe Pro Thr Asp Arg Gly
65              70              75              80
Trp Asp Val Gly Gly Leu Phe Asp Pro Glu Pro Gly Val Pro Gly Arg
            85              90              95
Ser Tyr Val Arg Glu Gly Gly Phe Leu His Glu Ala Gly Glu Phe Asp
            100             105             110
Ala Gly Phe Phe Gly Ile Ser Pro Arg Glu Ala Leu Ala Met Asp Pro
        115             120             125
Gln Gln Arg Leu Leu Leu Glu Thr Ser Trp Glu Ala Leu Glu Arg Ala
    130             135             140
Gly Ile Asp Pro His Thr Leu Arg Gly Ser Arg Thr Gly Val Tyr Ala
145             150             155             160
Gly Val Met Tyr His Asp Tyr Gly Ser Thr Ala Thr Val Ser Val Ala
            165             170             175
Ser Asp Asp Glu Thr Ala Gly Phe Leu Gly Thr Gly Thr Ser Gly Ser
        180             185             190
Val Ala Ser Gly Arg Ile Ser Tyr Val Leu Gly Leu Glu Gly Pro Ala
    195             200             205
Val Thr Val Asp Thr Ala Cys Ser Ser Ser Leu Val Ala Leu His Leu
    210             215             220
Ala Val Arg Ala Leu Arg Ser Gly Glu Cys Asp Leu Ala Leu Ala Gly
225             230             235             240
Gly Val Thr Val Met Ala Glu Pro Gly Val Phe Val Glu Phe Ser Arg
            245             250             255
Gln Arg Gly Leu Ala Ala Asp Gly Arg Cys Lys Ala Phe Ala Ala Ala
            260             265             270
Ala Asp Gly Thr Gly Trp Ala Glu Gly Val Gly Val Leu Ala Val Glu
    275             280             285
Arg Leu Ser Asp Ala Val Arg His Gly Arg Arg Val Leu Ala Val Val
    290             295             300
Arg Gly Ser Ala Val Asn Gln Asp Gly Ala Ser Asn Gly Leu Thr Ala
305             310             315             320
Pro Asn Gly Pro Ser Gln Gln Arg Val Ile Arg Gln Ala Leu Ala Asp
            325             330             335
Ala Arg Leu Gly Val Ala Asp Val Asp Val Val Glu Gly His Gly Thr
            340             345             350
Gly Thr Arg Leu Gly Asp Pro Ile Glu Ala Gln Ala Leu Leu Ala Thr
    355             360             365
Tyr Gly Gln Arg Asp Ala Gly Arg Ala Leu Arg Leu Gly Ser Leu Lys
    370             375             380
Ser Asn Val Gly His Thr Gln Ala Ala Ala Gly Val Ala Gly Val Ile
385             390             395             400
Lys Met Val Met Ala Met Arg His Gly Val Leu Pro Lys Thr Leu His
            405             410             415
Val Asp Glu Pro Thr Ala Glu Val Asp Trp Ser Ala Gly Ala Val Ser
            420             425             430
Leu Leu Arg Glu Gln Glu Ala Trp Pro Glu Val Gly Arg Leu Arg Arg
            435             440             445
Ala Ala Val Ser Ser Phe Gly Val Ser Gly Thr Asn Ala His Val Val
            450             455             460
Val Glu Glu Ala Pro Ala Ser Glu Ala Pro Val Ala Gly Glu Pro Val
465             470             475             480
Glu Pro Val Glu Pro Gly Ala Val Gly Leu Leu Pro Val Val Pro Val
            485             490             495
Val Val Ser Gly Arg Ser Ala Gly Ala Val Ala Glu Leu Ala Ser Arg
            500             505             510
Leu Asn Glu Ser Val Arg Ser Asp Arg Leu Val Asp Val Gly Leu Ser
```

```
            515                   520                   525
Ser Val Val Ser Arg Ser Val Phe Glu His Arg Ser Val Val Leu Ala
    530                   535                   540
Glu Asp Ser Ala Glu Leu His Thr Gly Leu Val Ala Val Gly Thr Gly
545                   550                   555                   560
Val Pro Ser Pro Gly Val Val Ser Gly Val Ala Ser Val Glu Gly Gly
                565                   570                   575
Arg Ser Val Phe Val Phe Pro Gly Gln Gly Thr Gln Trp Ala Gly Met
                580                   585                   590
Ala Leu Gly Leu Trp Ala Glu Ser Ala Val Phe Ala Glu Ser Met Ala
                595                   600                   605
Arg Cys Glu Ala Ala Phe Ala Gly Leu Val Asp Trp Arg Leu Ala Asp
    610                   615                   620
Val Leu Gly Asp Arg Ser Ala Leu Glu Arg Val Asp Val Val Gln Pro
625                   630                   635                   640
Ala Ser Phe Ala Val Met Val Ser Leu Ala Glu Leu Trp Arg Ser Leu
                645                   650                   655
Gly Val Val Pro Asp Ala Val Val Gly His Ser Gln Gly Glu Ile Ala
                660                   665                   670
Ala Ala Val Val Ala Gly Gly Leu Ser Leu Glu Asp Gly Ala Arg Val
    675                   680                   685
Val Val Leu Arg Ala Arg Leu Ile Gly Arg Glu Leu Ala Gly His Gly
    690                   695                   700
Gly Met Ala Ser Val Ala Leu Pro Val Ala Val Val Glu Glu Arg Leu
705                   710                   715                   720
Ala Ala Trp Ala Gly Arg Leu Gly Val Ala Val Val Asn Ala Pro Ser
                725                   730                   735
Ala Thr Val Val Ala Gly Asp Val Asp Ala Val Ala Glu Phe Val Thr
                740                   745                   750
Ala Cys Glu Val Glu Gly Val Arg Ala Arg Val Leu Pro Val Asp Tyr
    755                   760                   765
Ala Ser His Ser Ala His Val Glu Glu Leu Arg Ala Glu Leu Glu Gln
    770                   775                   780
Ile Leu Ala Gly Ile Asp Pro Val Ala Gly Glu Thr Pro Leu Tyr Ser
785                   790                   795                   800
Thr Val Glu Ala Gly Val Val Asp Thr Ala Ser Met Asp Ala Gly Tyr
                805                   810                   815
Trp Phe Arg Asn Leu Arg Arg Pro Val Arg Phe Gln Glu Thr Val Glu
                820                   825                   830
Arg Leu Leu Ala Asp Gly Phe Arg Val Phe Val Glu Cys Gly Ala His
    835                   840                   845
Pro Val Leu Thr Gly Ala Val Gln Glu Thr Ala Glu Ser Thr Gly Arg
    850                   855                   860
Gln Val Cys Ala Val Gly Ser Leu Arg Arg Asp Glu Gly Gly Leu Arg
865                   870                   875                   880
Arg Phe Leu Thr Ser Ala Ala Glu Ala Phe Val Gln Gly Val Glu Val
                885                   890                   895
Ser Trp Pro Val Leu Phe Asp Gly Thr Gly Ala Arg Thr Val Asp Leu
                900                   905                   910
Pro Thr Tyr Pro Phe Gln Arg Arg Arg Tyr Trp Leu Glu Ser Arg Pro
                915                   920                   925
Pro Ala Ala Val Val Pro Ser Gly Val Gln Asp Gly Leu Ser Tyr Glu
    930                   935                   940
Val Val Trp Lys Ser Leu Pro Val Arg Glu Ser Ser Arg Leu Asp Gly
945                   950                   955                   960
Arg Trp Leu Leu Val Val Pro Glu Thr Leu Asp Ala Asp Gly Thr Arg
                965                   970                   975
```

```
Ile Ala His Asp Leu Gln His Ala Leu Thr Thr His Gly Ala Thr Val
        980                 985                 990
His Thr Leu Ala Leu Asp Pro Ser Ala Ala His Phe Asp Gly Leu Phe
        995                1000                1005
Asp Gly Ile Leu Gln Glu Glu Thr Asp Val Thr Gly Ile Phe Ser Leu
       1010                1015                1020
Leu Gly Leu Ala Ser Gly Pro His Pro Asp His Gly Glu Val Glu Leu
1025               1030                1035                1040
Ala Gly Ala Ala Ser Leu Thr Leu Met Arg Gln Ala Gln Arg Asp Gly
                 1045                1050                1055
Phe Arg Ala Pro Val Trp Ala Val Thr Arg Gly Ala Val Ser Val Val
                 1060                1065                1070
Pro Gly Glu Val Pro Glu Thr Ala Gly Ala Gln Leu Trp Ala Leu Gly
            1075                1080                1085
Arg Val Ala Gly Leu Glu Leu Pro Asp Arg Trp Gly Gly Leu Ile Asp
       1090                1095                1100
Leu Pro Ala Asp Ala Asp Ala Arg Thr Ala Gly Leu Ala Val Arg Ala
1105               1110                1115                1120
Leu Ala Ala Gly Ile Ala Asp Gly Glu Asp Gln Leu Ala Val Arg Pro
                 1125                1130                1135
Ser Gly Ala Tyr Gly Arg Arg Leu Val Arg Ala Thr Ala Arg Arg Gly
            1140                1145                1150
Arg Lys Asp Trp Arg Pro Gln Gly Thr Val Leu Leu Ala Gly His Leu
            1155                1160                1165
Asp Ala Val Gly Glu Pro Leu Ala Arg Trp Leu Leu Thr Gly Gly Ala
       1170                1175                1180
Asp His Val Val Leu Ala Asp Pro Ala Leu Thr Glu Leu Pro Ala Thr
1185               1190                1195                1200
Leu Ala Asp Leu Ala Gln Thr Val Thr Thr Ala Ala Ala Pro Asp Leu
                 1205                1210                1215
Ala Asp Arg Ala Val Leu Ala Ala Leu Val Thr Glu Tyr Val Pro Ala
            1220                1225                1230
Thr Val Val Val Val Pro Pro Ala Ala Glu Leu Ala Pro Leu Ala Ser
       1235                1240                1245
Ile Ser Pro Ala Asp Leu Ala Ala Ala Val Thr Ala Lys Ser Ala Thr
       1250                1255                1260
Ala Ala His Phe Asp Ala Leu Leu Asp Gly Pro His Ala Pro Glu Leu
1265               1270                1275                1280
Val Leu Ile Ser Ser Val Ala Gly Ile Trp Gly Gly Val Arg Gln Gly
            1285                1290                1295
Ala Tyr Ala Val Gly Ala Ala His Leu Asp Ala Leu Ala Ala Arg Arg
            1300                1305                1310
Arg Ala Arg Gly Leu Ser Ala Ala Ser Val Ala Trp Thr Pro Trp Ala
            1315                1320                1325
Gly Ser Val Thr Ala Asp Gly Ser Ala Ala Glu Ser Leu Arg Gln Tyr
       1330                1335                1340
Gly Ile Ala Pro Leu Glu Pro Gln Ala Ala Leu Ala Glu Leu Asp Arg
1345               1350                1355                1360
Ala Leu Asn Gln Gln Leu His Gly Gly Gly Asp Ala Ala Val Ala
            1365                1370                1375
Asp Ile Asp Trp Glu Arg Phe Leu Ala Ser Phe Thr Ser Val Arg Pro
       1380                1385                1390
Ser Val Leu Phe Asp Glu Leu Pro Glu Val Arg Arg Leu Arg Glu Ala
            1395                1400                1405
Glu Ala Ala Ala Met Ala Asp Gln Ala Ala Ala Arg Thr Gly Ala Pro
       1410                1415                1420
Gly Gly Thr Glu Leu Ala Arg Ser Leu Arg Ala Lys Ser Leu Asn Ala
```

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```
      1425                    1430                    1435                    1440
Gln Arg Thr Ala Leu Leu Glu Leu Val Thr Ala His Val Ala Ala Val
                        1445                    1450                    1455
Leu Gly Glu Ser Val Pro Glu Ala Ile Asp Arg Ser Arg Ala Phe Lys
                1460                    1465                    1470
Asp Ile Gly Phe Thr Ser Met Thr Ala Met Glu Leu Arg Asn Arg Leu
            1475                    1480                    1485
Lys Glu Ala Thr Gly Leu Ala Leu Pro Ala Ser Leu Val Phe Asp His
        1490                    1495                    1500
Pro His Pro Gly Ala Leu Ala Asp His Leu Arg Glu Glu Leu Leu Gly
1505                    1510                    1515                    1520
Glu Asp Gly Ala Ala Gly Ala Asp Ser Ala Ala Glu Glu Pro Ser Ala
                1525                    1530                    1535
Thr Ser Pro Thr Val Gln Asp Glu Pro Ile Ala Ile Ile Gly Met Ala
                1540                    1545                    1550
Cys Arg Leu Pro Gly Asp Val Gly Thr Pro Asp Glu Leu Trp Glu Leu
        1555                    1560                    1565
Leu Glu Thr Gly Arg Asp Ala Met Ser Asp Leu Pro Val Asn Arg Gly
        1570                    1575                    1580
Trp Asp Val Ala Gly Leu Tyr Asp Pro Asp Pro Asp Ala Ala Gly Arg
1585                    1590                    1595                    1600
Ser Tyr Val Arg Glu Gly Gly Phe Leu His Asp Ala Gly Glu Phe Asp
                1605                    1610                    1615
Ala Glu Phe Phe Gly Ile Ser Pro Arg Glu Ala Leu Ala Met Asp Pro
                1620                    1625                    1630
Gln Gln Arg Ile Val Leu Glu Leu Ala Trp Glu Ser Phe Glu Arg Ala
        1635                    1640                    1645
Gly Leu Asp Pro Ala Gly Arg Arg Gly Ser Arg Thr Gly Val Phe Met
        1650                    1655                    1660
Gly Thr Asn Gly Gln His Tyr Met Pro Leu Leu Gln Asn Gly Asn Asp
1665                    1670                    1675                    1680
Ser Phe Asp Gly Tyr Leu Gly Thr Gly Asn Ser Ala Ser Val Met Ser
                1685                    1690                    1695
Gly Arg Ile Ser Tyr Thr Leu Gly Leu Glu Gly Pro Ala Leu Thr Val
                1700                    1705                    1710
Asp Thr Ala Cys Ser Ser Ser Leu Val Ala Leu His Leu Ala Val Arg
            1715                    1720                    1725
Ala Leu Arg Asn Gly Glu Cys Asp Leu Ala Leu Ala Gly Gly Ala Thr
        1730                    1735                    1740
Val Met Ser Thr Pro Glu Val Leu Val Glu Phe Ser Arg Gln Arg Ala
1745                    1750                    1755                    1760
Val Ser Ala Asp Gly Arg Cys Lys Ala Phe Ser Ala Ser Ala Asp Gly
                1765                    1770                    1775
Phe Gly Pro Ala Glu Gly Ala Gly Val Leu Leu Val Glu Arg Leu Ser
                1780                    1785                    1790
Asp Ala Val Arg His Gly Arg Arg Val Leu Ala Val Val Arg Gly Ser
            1795                    1800                    1805
Ala Val Asn Gln Asp Gly Ala Ser Asn Gly Leu Thr Ala Pro Asn Gly
        1810                    1815                    1820
Pro Ser Gln Gln Arg Val Ile Arg Gln Ala Leu Ala Asp Ala Arg Leu
1825                    1830                    1835                    1840
Gly Val Ala Asp Val Asp Val Val Glu Gly His Gly Thr Gly Thr Arg
                1845                    1850                    1855
Leu Gly Asp Pro Ile Glu Ala Gln Ala Leu Leu Ala Thr Tyr Gly Gln
        1860                    1865                    1870
Arg Asp Ala Gly Arg Pro Leu Arg Leu Gly Ser Leu Lys Ser Asn Val
        1875                    1880                    1885
```

64

Gly His Thr Gln Ala Ala Ala Gly Val Ala Gly Val Ile Lys Met Val
     1890   1895   1900
Met Ala Met Arg His Gly Val Leu Pro Lys Thr Leu His Val Asp Glu
1905   1910   1915   1920
Val Ser Pro His Val Asp Trp Ser Ala Gly Ala Val Ser Leu Leu Thr
          1925   1930   1935
Glu Gln Glu Pro Trp Pro Glu Val Gly Arg Pro Arg Arg Ala Ala Val
          1940   1945   1950
Ser Ser Phe Gly Leu Ser Gly Thr Asn Ala His Val Val Val Glu Glu
          1955   1960   1965
Ala Pro Val Gly Glu Ala Gly Gln Ala Ala Gly Asp Ala Arg Leu Ala
     1970   1975   1980
Val Val Pro Val Val Val Ser Gly Arg Ser Ala Gly Ala Val Ala Glu
1985   1990   1995   2000
Leu Ala Ser Arg Leu Asn Glu Ser Ile Arg Ser Asp Arg Leu Val Asp
               2005   2010   2015
Val Gly Leu Ser Ser Val Val Ser Arg Ser Val Phe Glu His Arg Ser
          2020   2025   2030
Val Leu Leu Ala Gly Asp Ser Gly Glu Leu His Thr Gly Leu Val Ala
          2035   2040   2045
Val Gly Thr Gly Val Pro Ser Pro Gly Val Val Ser Gly Val Ala Ser
          2050   2055   2060
Val Gly Gly Gly Arg Ser Val Phe Val Phe Pro Gly Gln Gly Thr Gln
2065   2070   2075   2080
Trp Ala Gly Met Ala Leu Gly Leu Trp Ala Glu Ser Ser Val Phe Ala
               2085   2090   2095
Glu Ser Met Ala Arg Cys Glu Ala Ala Phe Glu Gly Leu Val Asp Trp
          2100   2105   2110
Ser Leu Ala Asp Val Leu Gly Asp Gly Ser Ala Leu Glu Arg Val Asp
          2115   2120   2125
Val Val Gln Pro Ala Ser Phe Ala Val Met Val Ser Leu Ala Glu Leu
     2130   2135   2140
Trp Arg Ser Leu Gly Val Val Pro Asp Ala Val Val Gly His Ser Gln
2145   2150   2155   2160
Gly Glu Ile Ala Ala Ala Val Val Ala Gly Gly Leu Ser Leu Glu Asp
               2165   2170   2175
Gly Ala Arg Val Val Val Leu Arg Ala Arg Leu Ile Gly Arg Glu Leu
          2180   2185   2190
Ala Gly Arg Gly Gly Met Ala Ser Val Ala Leu Pro Val Ala Val Val
          2195   2200   2205
Glu Glu Arg Leu Ala Gly Trp Ala Gly Arg Leu Gly Val Ala Val Val
     2210   2215   2220
Asn Gly Pro Ser Ala Thr Val Val Ala Gly Asp Val Asp Ala Val Ala
2225   2230   2235   2240
Glu Phe Val Thr Ala Cys Glu Val Glu Gly Val Arg Ala Arg Val Leu
               2245   2250   2255
Pro Val Asp Tyr Ala Ser His Ser Ala His Val Glu Asp Leu Lys Ala
               2260   2265   2270
Glu Leu Glu Glu Val Leu Ala Gly Ile Gly Pro Val Thr Gly Gly Ile
          2275   2280   2285
Pro Phe Tyr Ser Thr Ser Glu Ala Ala Gln Ile Asp Thr Ala Gly Leu
     2290   2295   2300
Asp Ala Gly Tyr Trp Phe Gly Asn Leu Arg Arg Pro Val Arg Phe Gln
2305   2310   2315   2320
Glu Thr Val Glu Arg Leu Leu Ala Asp Gly Phe Arg Val Phe Val Glu
               2325   2330   2335
Cys Gly Ala His Pro Val Leu Thr Gly Ala Val Gln Glu Thr Ala Glu

65

```
                2340                    2345                    2350
Ser Thr Gly Arg Gln Val Cys Ala Val Gly Ser Leu Arg Arg Asp Glu
        2355                    2360                    2365
Gly Gly Leu Arg Arg Phe Leu Thr Ser Ala Ala Glu Ala Phe Val Gln
        2370                    2375                    2380
Gly Val Gly Val Phe Trp Pro Ala Leu Phe Asp Gly Thr Gly Ala Arg
2385                    2390                    2395                    2400
Ile Val Asp Leu Pro Thr Tyr Pro Phe Gln Arg Arg His Tyr Trp Tyr
                2405                    2410                    2415
Asn Asp Pro Ala Arg Arg Thr Gly Asp Ala Thr Ser Phe Gly Met Ala
                2420                    2425                    2430
Gln Ala Gly His Pro Leu Leu Asp Ala Gly Thr Glu Leu Pro Glu Ser
        2435                    2440                    2445
Gly Glu His Leu Tyr Thr Ala Arg Leu Ala Ala Asp Ser His Pro Trp
        2450                    2455                    2460
Leu Leu Glu His Thr Leu Leu Gly Ala Pro Leu Leu Pro Gly Ala Ala
2465                    2470                    2475                    2480
Phe Val Asp Leu Val Leu Trp Ala Gly Gly Glu Val Gly Cys Asp Leu
                2485                    ·2490                    2495
Ile Glu Glu Leu Thr Leu Thr Ser Pro Leu Leu Leu Ser Asp Ser Ala
                2500                    2505                    2510
Ala Leu Gln Leu Arg Leu Val Val Gly Thr Ala Asp Ala Glu Gly Arg
        2515                    2520                    2525
Arg Thr Ile Thr Val His Ser Arg Pro Asp Gly Asp Pro Arg Thr Thr
        2530                    2535                    2540
Arg Thr Pro Ala Ala Ser Ser Glu Thr Ser Pro Asp Ala Glu Ser Asp
2545                    2550                    2555                    2560
Thr Glu Ile Arg Arg Asp Thr Ser Ala Trp Thr Lys His Ala Gln Ala
                2565                    2570                    2575
Thr Val Ala Pro Ala Pro Asp Val Pro Pro Ser Gly Val Asp Ala Glu
        2580                    2585                    2590
Gly Asp Ala Val Arg Pro Ala Val Glu Trp Ser Val Ala Ala Thr Glu
        2595                    2600                    2605
Ser Asp Ala Phe Gln Ala Glu Asp Phe Tyr Ala Ser Phe Ala Ala His
        2610                    2615                    2620
Gly Tyr Gly Tyr Gly Pro Leu Phe Gln Gly Val Arg Ser Gly Arg Gln
2625                    2630                    2635                    2640
Asp Gly Thr Asp Val Tyr Ala Glu Val Ala Leu Asp His Asp Arg Leu
                2645                    2650                    2655
Pro Ser Ala Glu Gln Phe Gly Leu His Pro Ala Leu Leu Asp Ala Ala
        2660                    2665                    2670
Phe Gln Thr Met Arg Leu Gly Ser Phe Phe Pro Asp Asp Gly Gln Ala
        2675                    2680                    2685
Arg Val Pro Tyr Thr Phe Arg Gly Ile Arg Leu Tyr Ala Pro Gly Ala
        2690                    2695                    2700
Ala Arg Leu Arg Val Arg Val Ser Ala Val Gly Ala Asp Ala Val Arg
2705                    2710                    2715                    2720
Val Glu Cys Ala Asp Glu Arg Gly Arg Leu Val Cys Glu Ile Asp Ala
                2725                    2730                    2735
Leu Val Val Ser Thr Val Ser Pro Asp Gln Leu Arg Pro Ala Gly Gln
        2740                    2745                    2750
Asp Ala Thr Gln Asp Met Leu His Arg Ile Glu Trp Pro Val Leu Ser
        2755                    2760                    2765
Pro Pro Thr Gly Ser Ala Thr Ser Pro Ala Pro Pro Arg Trp Ile Val
        2770                    2775                    2780
Val Gly Gly Glu Asp Glu Gly Leu Gly Leu Gly Gly Leu Arg Leu Asp
2785                    2790                    2795                    2800
```

66

```
Gly Pro Arg Leu Asp Gly Pro Gly Leu Ala Glu Ala Leu Ser Glu Ala
              2805                2810                2815
Gly Met Gly Thr Glu Arg His Arg Asn Leu Ala Asp Ala Leu Ser Ala
              2820                2825                2830
Val Arg Thr Pro Val Asp Thr Ala Gly Ser Ala Ala Ala Ala Gly Thr
              2835                2840                2845
Thr Ser Leu Ile Ala Val Pro Val Pro Gln Ser Pro Thr Met Asp Ala
              2850                2855                2860
Gly Ala Val Arg His Ala Val His Arg Ala Leu Glu Leu Val Gln Gly
2865                2870                2875                2880
Trp Val Ala Ala Asp Glu Ala Ala Glu Glu Gly Gly Ser Asp Gly Ala
              2885                2890                2895
Ala Ala Asp Arg Arg Leu Val Leu Val Thr Ser Gly Ala Val Ser Thr
              2900                2905                2910
Gly Asp Ala Asp Pro Leu Arg Asp Pro Val Ala Ala Ala Val Trp Gly
              2915                2920                2925
Leu Ile Lys Ser Ala Gln Ser Glu Gln Pro Gly Arg Ile Val Leu Val
              2930                2935                2940
Asp Leu Asp Glu Gly Ala Val Asp Gly Ala Ala Leu Ala Ala Ala Ile
2945                2950                2955                2960
Ser Thr Gly Glu Pro Gln Leu Ala Leu Arg Asp Gly Asp Val His Val
              2965                2970                2975
Pro Arg Leu Ala Pro Leu Ser Val Arg Asp Ser Gln Thr Leu Leu Pro
              2980                2985                2990
Pro Ala Gly Thr Arg Ala Trp His Leu Val Gly Ala Gly Thr Gly Thr
              2995                3000                3005
Leu Ser Asp Leu Ala Leu Val Pro Ala Gln Thr Asp Thr Val Ala Leu
              3010                3015                3020
Ala Pro Gly Gln Val Arg Ile Ala Val Arg Ala Ala Gly Leu Asn Phe
3025                3030                3035                3040
Arg Asp Thr Leu Ile Ala Leu Gly Met Tyr Pro Gly Glu Gly Val Met
              3045                3050                3055
Gly Ala Glu Gly Ala Gly Val Ile Thr Glu Val Gly Pro Asp Val Val
              3060                3065                3070
Ser Leu Ala Val Gly Asp Arg Val Leu Gly Met Trp Thr Asp Gly Phe
              3075                3080                3085
Gly Pro Tyr Val Val Ala Asp His Arg Met Val Ala Pro Met Pro Arg
              3090                3095                3100
Asp Trp Ser Tyr Ala Glu Ala Ala Ser Val Pro Ala Val Phe Leu Ser
3105                3110                3115                3120
Ala Tyr Tyr Gly Leu Arg His Leu Ala Gly Leu Arg Ala Gly Gln Ser
              3125                3130                3135
Val Leu Val His Ala Ala Ala Gly Gly Val Gly Met Ala Ala Val Gln
              3140                3145                3150
Leu Ala Arg His Phe Gly Ala Glu Val Phe Gly Thr Ala Gly Thr Ala
              3155                3160                3165
Lys Trp Asp Ala Leu Arg Ala Gln Gly Leu Asp Asp Arg His Ile Ala
              3170                3175                3180
Gly Ser Arg Thr Leu Asp Phe Ala Asp Arg Phe Leu Asp Ala Thr Glu
3185                3190                3195                3200
Gly Arg Gly Val Asp Val Val Leu Asn Ser Leu Ala Gly Asp Phe Val
              3205                3210                3215
Asp Ala Ser Leu Arg Leu Leu Pro Arg Gly Gly Arg Phe Val Glu Leu
              3220                3225                3230
Gly Lys Ala Asp Val Arg Asp Ala Ala Gln Val Ala Ala Asp Arg Pro
              3235                3240                3245
Gly Thr Val Tyr Arg Ala Phe Glu Leu Met Glu Ala Gly Pro Glu Leu
```

67

```
        3250                  3255                    3260
Ile Gly Arg Met Leu Asn Glu Leu Leu Glu Leu Phe Glu Ser Gly Ala
3265                  3270                    3275                 3280
Leu Arg Leu Leu Pro Val Thr Pro Tyr Asp Ile Arg Arg Ala Pro Asp
                3285                  3290                    3295
Ala Phe Arg Thr Leu Ser Gln Ala Gly His Val Gly Lys Leu Val Leu
                3300                  3305                    3310
Thr Met Pro Pro Ala Phe Glu Pro His Gly Thr Val Leu Ile Thr Gly
          3315                  3320                    3325
Gly Thr Gly Asn Leu Gly Gly Thr Leu Ala Arg His Leu Val Thr Glu
          3330                  3335                    3340
His Gly Val Arg His Leu Leu Leu Ala Gly Arg Arg Gly Pro Glu Ala
3345                  3350                    3355                 3360
Glu Gly Ala Ala Glu Leu Val Arg Glu Leu His Asp Leu Gly Ala Ser
                3365                  3370                    3375
Val Thr Val Ala Ala Cys Asp Val Ala Asp Arg Ala Ala Leu Arg Lys
          3380                  3385                    3390
Leu Leu Gly Gly Ile Pro Pro Glu Arg Pro Leu Thr Gly Val Val His
          3395                  3400                    3405
Ala Ala Gly Val Leu Asp Asp Gly Val Val Thr Ser Leu Thr Pro Asp
    3410                  3415                    3420
Arg Val Asp Gly Val Leu Arg Pro Lys Val Asp Ala Ala Leu Asn Leu
3425                  3430                    3435                ·3440
His Glu Ala Ala Leu Asp Pro Glu Leu Gly Leu Asp Ile Thr Ala Phe
                3445                  3450                    3455
Val Leu Phe Ser Ser Val Ala Ala Leu Leu Gly Gly Ser Gly Gln Gly
          3460                  3465                    3470
Ser Tyr Ala Ala Ala Asn Gly Phe Leu Asp Gly Leu Ala Gln Tyr Arg
    3475                  3480                    3485
Arg Gly Arg Ser Leu Pro Ala Leu Ser Leu Gly Trp Gly Leu Ala Gly
    3490                  3495                    3500
Ser Gly Arg Met Thr Ser His Leu Asp Ser Arg Ala Leu Leu Arg Arg
3505                  3510                    3515                 3520
Met Ala Arg Gly Gly Val Leu Pro Leu Ser Pro Ala Glu Ser Met Ala
                3525                  3530                    3535
Leu Phe Asp Ala Ala Gln Gly Phe Asp Glu Ala Leu Gln Val Pro Ala
          3540                  3545                    3550
Arg Phe His Thr Ala Ala Leu Gly Ala Asp Gly Asn Val Pro Pro Leu
    3555                  3560                    3565
Phe Asn Gly Leu Ile Arg Gly Gly Thr Ala His Ala Glu Ala Arg Arg
    3570                  3575                    3580
Arg Thr Val Gly Ala Ser Pro Ala Gly Gly Pro Ala Gly Gly Glu Pro
3585                  3590                    3595                 3600
Val Asn Leu Ala Asp Arg Leu Ser Gly Leu Thr Glu Asp Glu Gln Arg
                3605                  3610                    3615
Ala Leu Leu Leu Asp Thr Val Arg Thr His Ala Ala Leu Val Leu Gly
          3620                  3625                    3630
His Thr Gly Thr Asp Gly Ile Gln Ala Asp Arg Ala Phe Lys Asp Leu
          3635                  3640                    3645
Gly Phe Asp Ser Leu Thr Ala Val Glu Met Arg Asn Arg Leu Thr Ala
    3650                  3655                    3660
Ala Thr Gly Leu His Leu Ala Ala Thr Leu Val Phe Asp His Pro Ala
3665                  3670                    3675                 3680
Pro Ala Asp Leu Ala Glu His Leu Arg Ser Arg Leu Val Pro Glu Gly
                3685                  3690                    3695
Thr Asp Val Pro Pro Leu Leu Ala Glu Leu Gly Arg Leu Glu Thr Ala
          3700                  3705          ·          3710
```

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```
Phe Lys Lys Leu Thr Thr Ala Asp Leu Ala Ser Val Val Pro Asp Asp
        3715                3720                3725
Ile Ala Arg Asp Glu Ile Ala Val Arg Leu Ala Ala Leu Gly Ser Leu
        3730                3735                3740
Trp Asn Gly Leu His Gly Asn Gly Leu Ser Gly Asp Ala Ala Gln Lys
3745                3750                3755                3760
His Gly Asp Ser Ile Val Glu Asp Ile Asp Ser Ala Asp Asp Asp Glu
                3765                3770                3775
Ile Phe Ala Phe Leu Asp Glu Ser Phe Gly Asp Ser
        3780                3785


<210> 26
<211> 1612
<212> PRT
<213> Streptomyces bikiniensis

<400> 26
Met Ala Thr Glu His Glu Gln Lys Leu Arg Asp Tyr Leu Lys Arg Ala
 1               5                  10                  15
Thr Thr Glu Leu His Lys Ala Thr Glu Arg Leu Lys Glu Val Glu Gln
        20                  25                  30
Arg Ala His Glu Pro Val Ala Ile Val Gly Met Gly Cys Arg Phe Pro
        35                  40                  45
Gly Gly Ala Ser Ser Pro Glu Glu Leu Trp Asp Leu Val Ala Ala Glu
        50                  55                  60
Thr Asp Ala Val Ser Pro Phe Pro Val Asp Arg Gly Trp Asp Val Thr
 65                  70                  75                  80
Gly Leu Tyr Asp Pro Asp Pro Asp Ala Ala Gly Arg Ala Tyr Val Arg
                85                  90                  95
Glu Gly Gly Phe Leu His Asp Ala Gly Glu Phe Asp Ala Gly Phe Phe
                100                 105                 110
Gly Ile Ser Pro Arg Glu Ala Leu Ala Met Asp Pro Gln Gln Arg Leu
        115                 120                 125
Leu Leu Glu Thr Ser Trp Glu Ala Leu Glu Arg Ala Gly Ile Asp Pro
        130                 135                 140
His Thr Leu Arg Gly Thr Arg Thr Gly Val Tyr Met Gly Ala Trp Asn
145                 150                 155                 160
Gly Gly Tyr Ala Glu Gly Ile Pro Gln Pro Thr Ala Glu Leu Glu Ala
                165                 170                 175
Gln Leu Leu Thr Gly Gly Val Val Ser Phe Thr Ser Gly Arg Val Ser
        180                 185                 190
Tyr Leu Leu Gly Leu Glu Gly Pro Ala Val Thr Val Asp Thr Ala Cys
        195                 200                 205
Ser Ser Ser Leu Val Ala Leu His Leu Ala Val Arg Ala Leu Arg Ser
        210                 215                 220
Gly Glu Cys Asp Leu Ala Leu Ala Gly Gly Ala Thr Val Met Ser Thr
225                 230                 235                 240
Pro Asp Val Phe Val Arg Phe Ser Arg Gln Arg Gly Val Ala Ala Asp
                245                 250                 255
Gly Arg Cys Lys Ala Phe Ser Ala Ser Ala Asp Gly Phe Gly Pro Ala
                260                 265                 270
Glu Gly Val Gly Val Leu Ala Val Glu Arg Leu Ser Asp Ala Val Arg
        275                 280                 285
His Gly Arg Arg Val Leu Ala Val Val Arg Gly Ser Ala Val Asn Gln
        290                 295                 300
Asp Gly Ala Ser Asn Gly Leu Thr Ala Pro Ser Gly Arg Ala Gln Ala
```

69

```
    305                     310                     315                     320
Leu Leu Ile Arg Arg Ala Leu Ala Asp Ala Arg Leu Gly Val Ala Asp
                325                     330                     335
Val Asp Val Val Glu Gly His Gly Thr Gly Thr Arg Leu Gly Asp Pro
            340                     345                     350
Ile Glu Ala Gln Ala Leu Leu Ala Thr Tyr Gly Gln Arg Asp Ala Gly
        355                     360                     365
Arg Pro Leu Arg Leu Gly Ser Leu Lys Ser Asn Val Gly His Thr Gln
    370                     375                     380
Ala Ala Ala Gly Val Ala Gly Val Ile Lys Met Val Met Ala Met Arg
385                     390                     395                     400
His Gly Val Leu Pro Lys Thr Leu His Val Asp Glu Pro Thr Ala Glu
                405                     410                     415
Val Asp Trp Ser Ala Gly Ala Val Ser Leu Leu Arg Glu Gln Glu Ala
            420                     425                     430
Trp Pro Glu Val Gly Arg Leu Arg Arg Ala Ala Val Ser Ser Phe Gly
        435                     440                     445
Val Ser Gly Thr Asn Ala His Val Val Val Glu Glu Ala Pro Val Pro
    450                     455                     460
Glu Asp Gly Glu Ala Val Gly Gly Gly Val Pro Leu Ala Val Val Pro
465                     470                     475                     480
Val Val Val Ser Gly Arg Ser Ala Gly Ala Val Ala Glu Leu Ala Gly
                485                     490                     495
Arg Val Ser Glu Val Ala Ala Ser Gly Arg Leu Val Asp Val Gly Leu
                500                     505                     510
Ser Ser Val Val Ser Arg Ser Val Phe Glu His Arg Ser Val Val Leu
            515                     520                     525
Ala Gly Asp Ser Ala Glu Leu Asn Ala Gly Leu Asp Ala Val Ala Gly
        530                     535                     540
Gly Val Pro Ser Pro Gly Val Val Ser Gly Val Ala Ser Gly Glu Gly
545                     550                     555                     560
Gly Arg Ser Val Phe Val Phe Pro Gly Gln Gly Thr Gln Trp Ala Gly
                565                     570                     575
Met Ala Leu Gly Leu Trp Ala Glu Ser Ser Val Phe Ala Glu Ser Met
                580                     585                     590
Ala Arg Cys Glu Ala Ala Phe Val Gly Leu Val Asp Trp Arg Leu Ser
            595                     600                     605
Gln Val Leu Ser Asp Gly Ser Ala Leu Glu Arg Val Glu Val Val Gln
        610                     615                     620
Pro Ala Ser Phe Ala Val Met Val Ser Leu Ala Glu Leu Trp Arg Ser
625                     630                     635                     640
Leu Gly Val Val Pro Asp Ala Val Val Gly His Ser Gln Gly Glu Ile
                645                     650                     655
Ala Ala Ala Val Val Ala Gly Gly Leu Ser Leu Glu Asp Gly Ala Arg
                660                     665                     670
Val Val Val Leu Arg Ala Arg Leu Ile Gly Arg Glu Leu Ala Gly Arg
            675                     680                     685
Gly Gly Met Ala Ser Val Ala Leu Pro Val Ala Val Val Glu Glu Arg
        690                     695                     700
Leu Ala Gly Trp Ala Gly Arg Leu Gly Val Ala Val Val Asn Gly Pro
705                     710                     715                     720
Ser Ala Thr Val Val Ala Gly Asp Val Asp Ala Val Ala Glu Phe Val
                725                     730                     735
Ala Ala Cys Glu Val Glu Gly Val Arg Ala Arg Val Leu Pro Val Asp
            740                     745                     750
Tyr Ala Ser His Ser Ala His Val Glu Asp Leu Lys Ala Glu Leu Glu
        755                     760                     765
```

70

```
Gln Ile Leu Ala Gly Ile Gly Pro Val Thr Gly Gly Ile Pro Phe Tyr
    770                 775                 780
Ser Thr Ser Glu Ala Ala Gln Ile Asp Thr Ala Gly Leu Asp Ala Gly
785                 790                 795                 800
Tyr Trp Phe Gly Asn Leu Arg Arg Pro Val Arg Phe Gln Glu Thr Val
                805                 810                 815
Glu Arg Leu Leu Ala Asp Gly Phe Arg Val Phe Val Glu Cys Gly Ala
            820                 825                 830
His Pro Val Leu Thr Gly Ala Val Gln Glu Thr Ala Glu Ser Thr Gly
        835                 840                 845
Arg Gln Val Cys Ala Val Gly Ser Leu Arg Arg Asp Glu Gly Gly Leu
        850                 855                 860
Arg Arg Phe Leu Thr Ser Ala Ala Glu Ala Phe Val Gln Gly Val Glu
865                 870                 875                 880
Val Ser Trp Pro Ala Leu Phe Glu Gly Thr Gly Ala Arg Thr Val Asp
                885                 890                 895
Leu Pro Thr Tyr Pro Phe Gln Arg Arg Arg Tyr Trp Leu Glu Ser Arg
            900                 905                 910
Pro Pro Ala Ala Pro Ile Glu Thr Ala Ala Ala Ser Gly Ile Glu Ser
            915                 920                 925
Trp Arg Tyr Arg Val Ala Trp Lys Ser Leu Ser Leu Ser Glu Ser Ser
        930                 935                 940
Arg Leu Asp Gly Arg Trp Leu Leu Val Val Pro Glu Thr Leu Asp Ala
945                 950                 955                 960
Asp Gly Thr Arg Ile Ala His Asp Ile Gln His Ala Leu Thr Thr His
                965                 970                 975
Gly Ala Thr Val Ser Arg Leu Thr Val Asp Val Thr Thr Thr Asp Arg
            980                 985                 990
Ala Asp Leu Ser Ala Arg Leu Thr Thr Thr Ala Ala Glu Asp Gln Gly
        995                 1000                1005
Pro Leu Arg Gly Val Leu Ser Leu Leu Ser Thr Asp Glu Arg Gln His
    1010                1015                1020
Pro Asp His Pro Gly Val Asp Arg Ala Thr Ala Gly Thr Met Leu Leu
1025                1030                1035                1040
Ala Gln Ala Cys Gly Asp Leu Val Val Ala Arg Gly Val Glu Pro Arg
            1045                1050                1055
Leu Trp Val Val Thr Arg Gly Ala Val Ala Val Ser Pro Ala Glu Arg
            1060                1065                1070
Pro Ser Ser Ala Gly Ala Gln Val Trp Gly Leu Gly Arg Cys Ala Ala
            1075                1080                1085
Leu Glu Leu Pro Thr Arg Trp Gly Gly Met Val Asp Leu Pro Pro Ala
    1090                1095                1100
Ala Arg Asp Ala Gly Arg His Val Arg Arg Leu Val Arg Leu Leu Ser
1105                1110                1115                1120
Glu Thr Cys Ala Glu Asp Gln Val Ala Leu Arg Ala Ser Gly Ala Tyr
            1125                1130                1135
Gly Arg Arg Leu Leu Pro Ala Ser Ser Pro Ser Val Ser Val Pro Arg
            1140                1145                1150
Thr Ala Lys Ser Gly Tyr Gln Pro Arg Gly Thr Val Leu Val Thr Gly
        1155                1160                1165
Gly Thr Gly Ala Leu Gly Gly His Leu Ala Arg Trp Leu Ala Arg Asn
    1170                1175                1180
Gly Ala Glu His Ile Val Leu Ala Gly Arg Arg Gly Glu Gly Ala Pro
1185                1190                1195                1200
Gly Ala Ala Glu Leu Ser Ala Glu Leu Lys Glu Leu Gly Ala Glu Val
            1205                1210                1215
Thr Val Ala Ala Cys Asp Val Ala Asp Arg Asn Ala Leu Arg Asp Met
```

71

```
                  1220                    1225                    1230
Leu Glu Ser Leu Pro Ala Asp Arg Pro Leu Ser Gly Val Phe His Ala
         1235                    1240                    1245
Ala Gly Val Pro His Ser Ala Pro Leu Ala Glu Thr Asp Val Ala Gly
      1250                    1255                    1260
Leu Ala Ala Val Leu Pro Gly Lys Val Val Gly Ala Arg His Leu His
1265                    1270                    1275                    1280
Glu Leu Thr Arg Glu Lys Glu Leu Asp Ala Phe Val Leu Tyr Ala Ser
                  1285                    1290                    1295
Gly Ala Gly Val Trp Gly Ser Gly Gln Ser Ala Tyr Gly Ala Ala
                  1300                    1305                    1310
Asn Ala Ala Leu Asp Ala Leu Ala Glu Gln Arg Arg Ala Glu Gly Leu
         1315                    1320                    1325
Pro Ala Thr Ser Val Ser Trp Gly Leu Trp Asp Gly Gly Gly Met Ala
         1330                    1335                    1340
Gly Glu Arg Gly Glu Glu Phe Leu Thr Ala Leu Gly Leu Arg Ala Met
1345                    1350                    1355                    1360
Glu Pro Glu Ser Ala Val Ala Ala Leu Glu Glu Ala Leu Asp Arg Gly
                  1365                    1370                    1375
Asp Thr Cys Val Ser Val Val Asp Val Asp Trp Ser Arg Phe Ala Glu
                  1380                    1385                    1390
Ser Phe Thr Ala Phe Arg Pro Ser Pro Leu Ile Gly Glu Leu Pro Gly
                  1395                    1400                    1405
Val Arg Ala Val Pro Asp Gly Ser Ala Gly Gly Pro Ser Asp Asp Leu
         1410                    1415                    1420
Ala Asp Ala Ala Arg His Gly Gly Ala Ala Asp Arg Gly Val Pro Ala
1425                    1430                    1435                    1440
Gly Leu Ala Arg Ala Thr Gly Asp Asp Arg Gln Asp Ile Leu Leu Asp
                  1445                    1450                    1455
Leu Val Arg Arg His Ala Ala Ala Val Leu Gly His Pro Gly Pro Gln
                  1460                    1465                    1470
His Ile Glu Pro Asp Ala Gly Phe Arg Thr Leu Gly Phe Ser Ser Val
         1475                    1480                    1485
Thr Ala Val Glu Leu Ala Asn Lys Leu Gly Ala Ala Val Gly Thr Lys
         1490                    1495                    1500
Ile Pro Ala Thr Phe Ala Phe Asp His Pro Asn Ala Arg Ala Ala Ala
1505                    1510                    1515                    1520
Ser Arg Leu Asp Val Leu Leu Ala Ala Ser Ser Asp Glu Thr Ala Gln
                  1525                    1530                    1535
Glu Ala Glu Ile Arg Gln Ala Leu Arg Thr Val Pro Leu Ala Arg Leu
                  1540                    1545                    1550
Arg Ala Ala Gly Leu Leu Asp Gly Leu Leu Glu Leu Ala Gly Leu Glu
         1555                    1560                    1565
Ala Glu Pro Gly Leu Pro Gly Asp Val Pro Asp Arg Gly Ala Ala Thr
         1570                    1575                    1580
Pro Asp Glu Glu Ser Ala Leu Ala Glu Val Asp Gly Leu Asp Ala Glu
1585                    1590                    1595                    1600
Ala Leu Val Asp Leu Val Leu Asn Gln Ser Asp Ser
                  1605                    1610


<210> 27
<211> 1350
<212> PRT
<213> Streptomyces bikiniensis

<400> 27
```

72

```
Met Ala Leu Ser Gln Glu Lys Val Leu Glu Ala Leu Arg Thr Ser Val
  1           5                  10              15
Lys Asp Ala Glu Arg Leu Arg Lys Arg Asn Arg Glu Leu Leu Ala Ala
           20                  25              30
Arg His Glu Pro Ile Ala Val Val Gly Met Ala Cys Arg Tyr Pro Gly
       35                  40              45
Gly Val Arg Ser Pro Glu Asp Leu Trp Glu Leu Val Val Ser Gly Thr
   50                  55                  60
Asp Ala Val Gly Pro Phe Pro Glu Asp Arg Gly Trp Asp Val Glu Arg
65                  70                  75                      80
Ile Tyr Asp Gln Asp Pro Ser Val Pro Gly Thr Thr Tyr Cys Arg Glu
               85                  90                  95
Gly Gly Phe Leu Tyr Asp Ala Gly Asp Phe Asp Ala Ala Phe Phe Gly
           100                 105                 110
Ile Gly Pro Arg Glu Ala Thr Val Met Asp Pro Gln Gln Arg Gln Leu
       115                 120                 125
Leu Glu Ala Ser Trp Glu Ala Leu Glu Gln Ala Gly Leu Asp Pro Arg
   130                 135                 140
Ala Leu Arg Gly Ser Gln Gly Gly Val Phe Val Gly Ala Ala Asn Gln
145                 150                 155                 160
Gly Tyr Val Pro Gly Asp Ala Ala Ala Ser Gly Arg Leu Pro Glu Gly
               165                 170                 175
Ser Asp Gly Tyr Leu Leu Thr Gly Asn Ala Asp Ala Val Leu Ser Gly
           180                 185                 190
Arg Ile Ser Tyr Phe Leu Gly Leu Glu Gly Pro Ser Met Thr Val Glu
       195                 200                 205
Thr Ala Cys Ser Ser Ser Leu Val Ala Leu His Leu Ala Val Gln Ala
   210                 215                 220
Leu Arg Arg Glu Glu Cys Glu Phe Ala Leu Ala Gly Gly Val Ala Val
225                 230                 235                 240
Leu Ala Asn Pro Ala Ala Tyr Val Glu Phe Ala Arg Gln Arg Gly Leu
               245                 250                 255
Ala Pro Asp Gly Arg Cys Lys Ala Phe Asp Asp Ala Ala Asp Gly Thr
           260                 265                 270
Gly Trp Ala Glu Gly Val Gly Val Leu Val Val Glu Arg Leu Ser Asp
       275                 280                 285
Ala Val Arg Lys Gly His Arg Val Leu Ala Val Val Arg Gly Thr Ala
   290                 295                 300
Val Asn Gln Asp Gly Ala Ser Ser Gly Leu Ser Val Pro Asn Gly Pro
305                 310                 315                 320
Ser Gln Gln Arg Val Ile Arg Arg Ala Leu Ala Asp Ala Arg Leu Glu
           325                 330                 335
Ala Gly Gln Ile Asp Ala Val Glu Ala His Gly Thr Gly Thr Arg Leu
           340                 345                 350
Gly Asp Pro Ile Glu Ala Gln Ala Leu Leu Asp Thr Tyr Gly Glu Glu
           355                 360                 365
Arg Ser Pro Glu Arg Pro Leu Trp Val Gly Ser Leu Lys Ser Asn Phe
   370                 375                 380
Gly His Ala Gln Ala Ala Ala Gly Val Gly Gly Val Ile Lys Thr Val
385                 390                 395                 400
Met Ala Leu Arg His Gly Leu Leu Pro Arg Thr Leu His Val Thr Ser
           405                 410                 415
Pro Thr Arg His Val Asp Trp Gly Asp Gly Gln Val Arg Leu Leu Thr
           420                 425                 430
Glu Pro Val Asp Trp Pro Arg Thr Gly Ala Pro Arg Arg Ala Ala Val
           435                 440                 445
Ser Ala Phe Gly Val Ser Gly Thr Asn Gly His Ile Ile Leu Glu Glu
```

73

```
            450                   455                   460
Ala Pro Pro Pro Thr Arg Pro Glu Ala Val Arg Gln Ala Gly Glu Arg
465                   470                   475                   480
Arg Pro Val Leu Val Pro Trp Thr Leu Ser Gly Arg Thr Arg Pro Ala
                485                   490                   495
Leu Cys Arg Gln Ala Ala Arg Leu Ala Ala His Leu Glu Gln His Pro
                500                   505                   510
Asp Leu Asp Pro Leu Asp Val Gly Phe Ser Leu Ala Thr Thr Arg Thr
                515                   520                   525
His Phe Glu His Arg Ala Val Leu Leu Ala Asp Ala Ala Thr Glu Gly
                530                   535                   540
Gly Ser Arg Ala Asp Ala Leu Gly Ala Leu Arg Ala Ile Ala Glu Asp
545                   550                   555                   560
Arg Asp Pro Gly Gly Ala Val Arg Asp Thr Ala Arg Gly Glu Gly Arg
                565                   570                   575
Ile Ala Phe Leu Phe Cys Gly Gln Gly Ser Gln Arg Pro Gly Met Ala
                580                   585                   590
Glu Gln Leu Tyr Ala Gln Tyr Pro Ala Phe Ala Arg Glu Leu Asp Thr
                595                   600                   605
Ile Ala Thr His Leu Asp Ala His Leu Asp Arg Pro Leu Ala Thr Val
                610                   615                   620
Met Phe Ala Pro Ala Gly Thr Ala Glu Ala Ala Leu Leu Asp Gly Thr
625                   630                   635                   640
Gln Tyr Ala Gln Ala Ala Leu Phe Ala Val Glu Val Ala Leu Phe Arg
                645                   650                   655
Leu Phe Glu Gly Trp Gly Leu Arg Pro Asp Val Leu Leu Gly His Ser
                660                   665                   670
Val Gly Glu Leu Ala Ala Ala His Val Ala Gly Val Phe Gly Pro Ala
                675                   680                   685
Asp Ala Cys Ser Leu Val Ala Ala Arg Gly Arg Leu Met Gln Glu Leu
                690                   695                   700
Pro Ala Gly Gly Ala Met Leu Ser Val Arg Ala Ala Glu His Glu Val
705                   710                   715                   720
Arg Glu Leu Ile Ala Gly Gln Glu Asp Arg Ile Ala Val Ala Ala Val
                725                   730                   735
Asn Gly Pro Arg Ser Val Val Val Ser Gly Asp Glu Asp Ala Val Ser
                740                   745                   750
Ala Leu Ala Glu Glu Leu Thr Glu Tyr Gly Val Arg Thr Lys Arg Leu
                755                   760                   765
Asn Val Ser His Ala Phe His Ser Pro Arg Leu Asp Ser Met Leu Glu
                770                   775                   780
Thr Phe Arg Arg Val Ala Glu Thr Val Glu Tyr Arg Glu Pro Thr Leu
785                   790                   795                   800
Asp Val Ile Ser Gly Leu Thr Gly Arg Pro Ala Asp Ala Gly Glu Leu
                805                   810                   815
Ala Thr Ala Asp Tyr Trp Val Arg Gln Ala Arg Glu Thr Val Arg Phe
                820                   825                   830
His Asp Gly Val Arg Ala Ala His Ala Arg Gly Val Ser Thr Phe Val
                835                   840                   845
Glu Leu Gly Pro Asp Gly Val Leu Cys Gly Leu Ala Leu Glu Thr Leu
                850                   855                   860
Ala Glu Glu Thr Asp Gly Glu Ala Ala Ala Glu Thr Pro Gly Arg Ala
865                   870                   875                   880
Arg Ala Ala Leu Val Pro Val Met Arg Arg Glu Arg Pro Glu Gly Ser
                885                   890                   895
Thr Leu Leu Thr Ala Leu Ala Thr Ala His Ala Arg Gly Ala Glu Val
                900                   905                   910
```

74

```
Asp Trp Ser Arg Phe Tyr Ala Asp Thr Gly Ala Arg His Thr Thr Leu
        915                 920                 925
Pro Thr Tyr Ala Phe Gln Arg Gln Arg Phe Trp Leu Glu Thr Ala Ala
        930                 935                 940
Pro Ala Ala Pro Ala Ala Gly Gln Gly Ala Gly Pro Ala Asp Pro Gln
945                     950                 955                 960
Asp Ser Thr Gly Pro Ala Ala Arg Pro Thr Leu Thr Glu Gln Asp Leu
            965                 970                 975
Leu Leu Leu Val Arg Thr Glu Ala Ala Ala Ala Leu Gly His Ala Glu
            980                 985                 990
Leu Glu Asp Val Pro Ala Asp Ser Leu Phe Gly Asp Ile Gly Phe Asp
        995                 1000                1005
Ser Leu Ala Ala Ile Glu Leu Gly Ala Ala Leu Thr Gly Ala Thr Gly
    1010                1015                1020
Leu Glu Val Pro Ser Ser Leu Val Leu Asp His Pro Thr Pro Arg Glu
1025                1030                1035                1040
Leu Ala Ala His Leu Ala Ala Ala Arg Thr Ala Ala Asp Ser Asp Asp
                1045                1050                1055
Thr Ser Pro Glu Gly Pro Asp Thr Ala Gly Glu Ser Ser Leu Ser Ala
            1060                1065                1070
Met Tyr Arg Arg Ala Val Arg Leu Gly Arg Ala Glu Pro Phe Ile Gly
        1075                1080                1085
Thr Leu Ala Glu Leu Ala Ala Phe Arg Pro Val Phe Pro Ala Asp His
        1090                1095                1100
Thr Leu Ala Asp Gly Glu Thr Val Gly Gln Ala Ala Ala Ala Trp Gln
1105                1110                1115                1120
Pro Ala Pro Val Arg Leu Ala Thr Thr Asp Gly Glu Gly Pro Glu Leu
            1125                1130                1135
Ile Cys Cys Ala Gly Thr Ala Val Ala Ser Gly Pro Glu Glu Phe Thr
        1140                1145                1150
Ala Leu Ala Ala Ala Leu Gly Asp Arg Leu Thr Val Ser Ala Leu Arg
        1155                1160                1165
Gln Pro Gly Phe Arg Ala Asn Glu Leu Leu Pro Gly Ser Leu Asp Gly
        1170                1175                1180
Leu Leu Asp Ala Gln Ala Asp Ala Val Leu Arg His Thr Gly Asp Arg
1185                1190                1195                1200
Pro Tyr Ala Leu Leu Gly His Ser Ala Gly Gly Ala Leu Ala His Ala
            1205                1210                1215
Leu Ala Cys Arg Leu Glu Glu Leu Gly Ala Gly Pro Ala Ala Leu Val
            1220                1225                1230
Leu Ala Asp Val Tyr Leu Pro Ser Ser Pro Gly Ala Met Gly Val Trp
        1235                1240                1245
Arg Asn Glu Met Leu Asp Trp Val Met Arg Arg Ser Val Val Ser Ile
        1250                1255                1260
Asp Asp Ala Arg Leu Thr Ala Met Gly Ala Tyr Asn Gln Met Leu Leu
1265                1270                1275                1280
Glu Trp Thr Pro Arg Pro Thr Lys Ala Pro Val Leu Phe Leu Arg Ala
            1285                1290                1295
Thr Glu Pro Val Arg Pro Trp Ser Gly Glu Pro Glu Ser Trp Arg Ala
            1300                1305                1310
His Trp Asp Gly Gly Asp His Thr Ala Val Asp Val Pro Gly Thr His
        1315                1320                1325
Leu Thr Leu Met Thr Glu His Ala Arg His Leu Ala Ala Thr Leu His
    1330                1335                1340
Thr Trp Leu Gly Thr Leu
1345                1350
```

75

<210> 28
<211> 412
<212> PRT
<213> Streptomyces bikiniensis

<400> 28
Val Thr Thr Gln Trp Thr Thr Pro Ser Val Leu Gly Arg Arg Leu Gln
1   5   10   15
Arg Thr Tyr Val Gly His Trp Phe Ala Gly Thr Gln Gly Asp Pro Tyr
            20   25   30
Ala Leu Ile Leu Arg Ala Gln Arg Asp Asp Thr Thr Pro Tyr Glu Glu
        35   40   45
Asp Val Arg Ala Arg Gly Pro Val Phe His Ser Glu Val Leu Asp Thr
    50   55   60
Trp Val Ile Thr Asp Gly Ala Leu Ala Arg Ser Val Leu Thr Asp Ala
65   70   75   80
Arg Phe Gly Gly Leu Thr Arg Ala Gly Gly Arg Tyr Arg Ala Glu Leu
                85   90   95
Leu Pro Pro Ala Gly Pro Glu Val Gly Pro Ala Arg Ala Gly Val Arg
            100   105   110
Gly Gly Val Arg Ala Asp Ala Asp Pro Ala Val Ser Ala Gln Asp Glu
        115   120   125
Val Val Val Glu Ala Leu Ala Glu Gln Leu Ser Arg Thr Leu Leu Gly
    130   135   140
Gly Leu Gly Asp Asp Phe Asp Leu Val Ala Ala Phe Ala Arg Arg Leu
145   150   155   160
Pro Ala Gln Val Leu Ala Glu Phe Leu Gly Leu Pro Ala Ala Ala Arg
                165   170   175
Ser Arg Phe Glu Glu Leu Leu Ala Gly Cys Ala His Ser Leu Asp Ser
            180   185   190
Arg Leu Cys Pro Gln Thr Leu Asp Ile Thr Arg Thr Gly Leu Gly Ala
            195   200   205
Ala Ala Glu Leu Arg Glu Leu Leu Ala Arg His Leu Gly Gly Ser Gly
        210   215   220
Pro Arg Ser Ala Gln Ala Ala Val Ser Leu Ala Val Glu Val Ala Ala
225   230   235   240
Pro Ala Gly Ala Leu Ile Cys Asn Ala Val Glu Ala Leu Ser Ser Ser
                245   250   255
Pro Gly Gln Trp Asn Ala Leu Arg Gln Asn Pro Glu Lys Ala Asp Ala
            260   265   270
Val Val Ala Glu Thr Trp Trp Arg Arg Pro Pro Val Arg Val Glu Ser
        275   280   285
Arg Ile Ala Gln Glu Asp Val Asp Val Ala Gly Val Pro Val Pro Ala
        290   295   300
Asp Gly His Val Ala Ile Leu Val Ala Ala Gln Arg Asp Pro Ala
305   310   315   320
Ile Thr Pro Ala Pro Thr Lys Asp Asp Thr Gly Thr Pro Gly Gln Gly
                325   330   335
Asp Cys Gly Val Pro Leu Gly Leu Val Gly Asp Ala His Ala Thr Ser
            340   345   350
Ala Ala Arg Thr Val Arg Ala Leu Cys Arg Gly Ala Leu Arg Ala Leu
        355   360   365
Ala Gln Glu Ala Pro Gly Leu Arg Pro Asn Gly Thr Pro Val Arg Leu
        370   375   380
Arg Arg Ala Pro Val Thr Leu Gly His Ala Arg Phe Pro Val Ala Arg
385   390   395   400

76

Thr Gly Arg Gly Thr Pro Thr Asp Ala Gly Ala Ala
                    405   410

<210> 29
<211> 425
<212> PRT
<213> Streptomyces bikiniensis

<400> 29
Met Arg Val Leu Met Thr Ser Ile Ala His Asn Thr His Tyr Tyr His
 1   5   10   15
Leu Val Pro Leu Ala Trp Ala Leu Lys Ala Ala Gly His Glu Val Arg
                20   25   30
Val Ala Gly Gln Pro Arg Val Thr Asp Ile Ile Thr Gly Ser Gly Leu
            35   40   45
Thr Ala Val Pro Val Gly Asp Asp Glu Asp Met Met Glu Leu Phe Ala
        50   55   60
Glu Ile Gly Gly Asp Ile Thr Pro Tyr Gln Glu Gly Leu Asp Phe Ala
65   70   75   80
Glu Glu Arg Pro Glu Ala Arg Ser Trp Glu His Leu Leu Gly Gln Gln
                85   90   95
Thr Val Leu Thr Ser Leu Cys Phe Ala Pro Leu Asn Gly Asp Ser Thr
                100   105   110
Met Asp Asp Ile Val Ala Leu Ala Arg Ser Trp Gln Pro Asp Leu Val
        115   120   125
Ile Trp Glu Pro Phe Thr Phe Ala Gly Ala Val Ala Ala His Ala Val
        130   135   140
Gly Ala Ala His Ala Arg Val Leu Trp Gly Pro Asp Val Ile Gly Arg
145   150   155   160
Ala Arg Glu Arg Phe Val Glu Ala Lys Ala Gln Gln Ala Pro Glu His
                165   170   175
Arg Glu Asp Pro Met Ala Glu Trp Leu Gly Trp Thr Leu Glu Arg Leu
            180   185   190
Gly Leu Pro Ala Ala Gly Asp Gly Met Glu Glu Leu Leu Asn Gly Gln
            195   200   205
Trp Val Ile Asp Pro Gly Pro Glu Ser Val Arg Leu Asp Leu Arg Glu
        210   215   220
Pro Ile Leu Pro Met Arg Phe Val Pro Tyr Asn Gly Pro Ala Val Val
225   230   235   240
Pro Gly Trp Leu Ser Glu Lys Pro Lys Arg Pro Arg Val Cys Leu Thr
            245   250   255
Gln Gly Val Ser Gly Arg Glu Thr His Gly Lys Asp Ala Val Arg Phe
            260   265   270
Gln Asp Leu Leu Ala Ala Leu Gly Asp Leu Asp Ile Glu Ile Val Ala
        275   280   285
Thr Leu Asp Ser Thr Gln Arg Glu Asn Leu Thr Glu Val Pro Asp Asn
        290   295   300
Val Arg Ile Val Asp Phe Val Ser Met Asp Val Leu Leu Pro Ser Cys
305   310   315   320
Ala Met Ile Ile Tyr His Gly Gly Ala Gly Thr Ser Ala Thr Ala Leu
            325   330   335
Leu His Gly Val Pro Gln Val Val Ile Gly Ala His Trp Asp Val Pro
            340   345   350
Val Arg Ala Arg Gln Leu Asp Asp Leu Gly Ala Gly Ile Phe Ile Arg
            355   360   365
Pro Glu Asp Leu Asp Ala Ala Thr Leu Arg Ala Ala Val Gln Arg Val

77

```
          370                     375                     380
Leu Thr Glu Pro Ser Leu Gln Arg Ala Ala Asp Arg Leu Arg Ala Glu
385                     390                     395                     400
Met Arg Ser Asn Pro Thr Pro Ala Glu Thr Val Thr Val Leu Glu Arg
                    405                     410                     415
Leu Ser Arg Ser His Arg Gln Pro Arg
                420                     425


<210> 30
<211> 248
<212> PRT
<213> Streptomyces bikiniensis

<400> 30
Met Glu Phe Glu Gly Gln Val Ala Leu Val Thr Gly Ala Gly Arg Gly
  1                   5                    10                      15
Ile Gly Arg Ala Thr Val Val Arg Leu Ala Glu Ala Gly Cys Asp Ile
                20                    25                      30
Ala Leu His Tyr Asn Gln Ala Lys Ala Gln Ala Glu Glu Val Ala Glu
            35                    40                      45
Arg Ile Ala Ala Leu Gly Arg Thr Val Glu Leu Phe Pro Gly Asp Leu
        50                    55                      60
Ser Arg Pro Glu Thr Gly Arg Gln Leu Val Ala Ala Val Gln Gln Lys
65                    70                    75                      80
Phe Asp Arg Ile Asp Ile Leu Val Asn Ser Ala Gly Ile Thr Arg Asp
                85                    90                      95
Lys Leu Leu Leu Ser Met Glu Ala Asp Asp Ile His Gln Val Ile Ala
            100                   105                     110
Thr Asn Leu Val Gly Pro Met Phe Leu Thr Gln Ala Val Ala Leu Thr
            115                   120                     125
Met Leu Arg Gln Arg Ser Gly Arg Ile Val Asn Ile Ser Ser Ala Ala
            130                   135                     140
Ala Ser Arg Pro Gly Lys Gly Gln Ser Asn Tyr Ala Ala Ser Lys Ala
145                   150                   155                     160
Gly Leu Glu Ala Phe Thr Arg Ala Met Ala Val Glu Leu Gly Ser Arg
                165                   170                     175
Gly Ile Leu Val Asn Ala Val Ala Pro Gly Ile Val Lys Thr Gly Leu
                180                   185                     190
Thr Glu Ala Leu Arg Glu Gly Ala Glu Pro Glu Leu Leu Ala Arg Gln
            195                   200                     205
Val Ile Gly Ser Phe Ala Glu Pro Glu Ala Val Ala Glu Ala Val Ala
        210                   215                     220
Tyr Leu Ala Ser Pro Arg Asn Thr His Thr Thr Gly Thr Val Leu Thr
225                   230                   235                     240
Val Asp Gly Gly Leu Lys Met Val
                245


<210> 31
<211> 382
<212> PRT
<213> Streptomyces bikiniensis

<400> 31
Met Ser Ala Ser Leu Ser Pro Ala Arg Thr Arg Ala Ala Leu Arg Ala
  1                   5                    10                      15
```

78

Ser Ala Arg Ile Ser Thr Glu Leu Leu Leu Val Leu Leu Gly Thr Ala
                20   25   30
Ala Val Ile Trp Leu Leu Gly Arg Met Trp Ser Ile Val Trp Pro Leu
            35   40   45
Val Ile Gly Leu Leu Ile Thr Thr Leu Thr Trp Pro Phe Ala Arg Leu
        50   55   60
Leu Arg Arg Leu Gly Trp Pro Pro Ala Leu Ala Ala Ser Val Val Thr
65   70   75   80
Val Leu Phe Leu Ala Val Thr Ala Gly Thr Val Ala Leu Ile Ala Val
                85   90   95
Pro Val Ala Ser Gln Ser Gly Glu Leu Ala Asp Gly Val Val Glu Gly
                100   105   110
Ile Gln Arg Leu Arg Glu Trp Thr Ala Gly Pro Pro Leu Asn Ile Gly
            115   120   125
Asp Asp Gln Ile Thr Gly Ala Leu Asp Thr Ala Thr Asp Arg Leu Gln
    130   135   140
Asn Ser Val Gly Ser Leu Leu Thr Thr Leu Ala Thr Gly Val Gly Thr
145   150   155   160
Val Val Asn Gly Val Val Thr Ala Val Leu Ala Leu Phe Leu Met Phe
                165   170   175
Phe Phe Leu Lys Asp Gly Pro Arg Phe Leu Pro Trp Leu Ala Arg Gln
            180   185   190
Leu Pro Gly Arg Leu Ala Thr Asp Ala Thr Thr Ile Ala Glu Arg Gly
            195   200   205
Trp Asp Thr Leu Gly Ala Phe Val Arg Ser Gln Ala Ala Val Gly Leu
    210   215   220
Leu Asp Ala Val Leu Ile Gly Ile Gly Leu Trp Ile Leu Gly Val Pro
225   230   235   240
Leu Val Leu Pro Leu Ala Val Leu Thr Phe Val Ser Ala Phe Val Pro
                245   250   255
Ile Ile Gly Ala Leu Leu Ala Gly Phe Val Ala Val Leu Ile Ala Leu
                260   265   270
Val Ser Asn Gly Leu Thr Asp Ala Leu Ile Val Leu Ala Ile Ile Val
    275   280   285
Val Val Gln Gln Leu Glu Gly Asn Val Phe Gln Pro Met Ile Gln Ser
    290   295   300
Arg Gly Leu Gly Leu His Ala Ala Val Val Leu Leu Ala Val Thr Leu
305   310   315   320
Gly Gly Ser Leu Ala Gly Ile Val Gly Ser Leu Leu Ala Val Pro Val
                325   330   335
Ala Ala Leu Val Ala Val Val Trp Gly Tyr Val Arg Glu Gln Leu Ser
            340   345   350
Asp Pro Pro Gln Leu Asp Ala Asp Gly Gly Thr Arg Pro Gly Pro Asp
            355   360   365
Gly Ala Pro Glu Ser Val Val Pro Ala Glu Ile Pro Ala Ser
    370   375   380

<210> 32
<211> 487
<212> PRT
<213> Streptomyces bikiniensis

<400> 32
Met Thr Ala Thr Thr Arg Arg Asp Pro Ala Ala Val Pro Asp Gly Gly
 1   5   10   15
Thr Ala Glu Pro Val Pro Ser Pro Ala Ala Pro Asp Gly Arg Ala Ala

```
                 20                      25                      30
Gln Thr Val Pro Ser Pro Ala Ala Pro Asp Ser Gly Ala Ala Glu Ser
            35                      40                      45
Ala Pro Ser Thr Ala Ala Asp Gly Arg Ala Glu Gln Thr Val Cys Ser
        50                      55                      60
Leu Ala Ala Asp Gly Thr Ala Asp Gly Arg Gly Arg Ala Pro Gly Ala
65                      70                      75                      80
Ala Val Gly Val Gly Asp Ala Gly Pro Arg Arg Arg Trp Trp Arg Arg
                85                      90                      95
Arg Gly Ala Ala Val Thr Gly Cys Ser Val Phe Leu Ala Ala Pro Asp
            100                     105                     110
Gly Arg Ala Ala Gln Thr Val Pro Ser Pro Ala Ala Pro Asp Ser Gly
            115                     120                     125
Ala Ala Glu Ser Ala Pro Ser Thr Ala Ala Asp Gly Arg Ala Glu Gln
        130                     135                     140
Thr Val Cys Ser Leu Ala Ala Asp Gly Thr Ala Asp Gly Arg Gly Arg
145                     150                     155                     160
Ala Pro Gly Ala Ala Val Gly Val Gly Asp Ala Gly Pro Arg Arg Arg
                165                     170                     175
Trp Trp Arg Arg Arg Gly Ala Ala Val Thr Gly Cys Ser Val Phe Leu
            180                     185                     190
Ala Val Ser Val Ala Gly His Gly Arg Leu Pro Gly Leu Pro Gly Arg
            195                     200                     205
Leu Ser Ser Leu Ala Glu Thr Leu Leu Pro Trp Ser Ala Leu Ala Val
        210                     215                     220
Pro Val Leu Val Thr Ala Ala Leu Leu Trp Arg Ala Arg Val Ala Ala
225                     230                     235                     240
Val Val Ala Leu Val Val Pro Ala Val Ala Trp Leu Thr Ala Phe Gly
                245                     250                     255
Gly Ala Leu Thr Asp Lys Thr Thr Pro Gly Gly Asp Leu Thr Leu Val
            260                     265                     270
Ser His Asn Val Glu Gln Ala Asn Pro Asp Pro Ala Gly Thr Val Arg
            275                     280                     285
Ser Leu Leu Ala Ala Gly Ala Asp Val Leu Ala Leu Glu Glu Leu Ser
        290                     295                     300
Pro Ala Thr Ala Pro Ala Tyr Glu Arg Ala Leu Ala Glu Ser Tyr Pro
305                     310                     315                     320
Tyr His Phe Tyr Glu Gly Thr Val Gly Leu Trp Ser Val His Pro Leu
                325                     330                     335
Ser Asp Ala Arg Ala Val Pro Ile Met Pro Trp Thr Arg Ala Met Arg
            340                     345                     350
Ala Thr Val Asp Ala Pro Gly Gly Pro Leu Ala Val Tyr Val Ala His
            355                     360                     365
Leu Pro Ser Val Arg Val Gly Pro Gly Gly Phe Thr Ala Gly Ala Arg
        370                     375                     380
Asp Glu Ala Leu Gly Leu Leu Ala Ala Glu Val Arg Ala Glu Pro Val
385                     390                     395                     400
Arg Arg Val Val Leu Leu Gly Asp Leu Asn Gly Ser Thr Asp Asp Arg
                405                     410                     415
Ala Leu Arg Pro Leu Thr Asp Arg Leu Val Ser Ala Gln Ala Ala Ala
            420                     425                     430
Gly Ala Gly Phe Gly Phe Thr Trp Pro Ala Arg Leu Pro Val Val Arg
            435                     440                     445
Ile Asp Gln Ile Leu Leu Gly Gly Val Arg Ala Ala Ser Ala Trp Thr
        450                     455                     460
Leu Pro Ala Thr Ala Ser Asp His Leu Pro Val Ala Ala Arg Ile His
465                     470                     475                     480
```

80

```
Leu Ala Pro Asp Pro Ala Pro
                485
```

```
<210> 33
<211> 231
<212> PRT
<213> Streptomyces bikiniensis
```

```
<400> 33
Met Thr Ala Tyr Val Ile Leu Glu Glu His Pro Leu Arg Pro Asp Glu
  1               5                  10                  15
Asp Gly Pro Leu Ile Glu Val Asp Arg Thr Ala Ala His Glu Ala Gly
               20                  25                  30
Val Gly Gly Glu Ser Thr Val Pro Val Arg Ser Gly Glu Arg His Ser
               35                  40                  45
Gln Arg Arg Leu Leu Glu Leu Leu Leu Ile Pro Ser Gly Asn Asn Val
       50                  55                  60
Ala Arg Leu Leu Ala Arg Trp Asp Ser Gly Ser Gln Ala Ala Phe Val
 65                  70                  75                  80
Thr Lys Met Arg Arg Ala Ala Val Arg Leu Gly Met Lys Asp Thr Val
               85                  90                  95
Tyr Thr Gly Ala Ser Gly Ile Glu Pro Thr Thr Thr Ser Thr Ala Ala
              100                 105                 110
Asp Gln Val Arg Leu Thr Arg Ala Ala Met Glu Asp Pro Val Phe Arg
              115                 120                 125
Ala Val Val Ala Thr Arg Glu Thr Thr Val Pro Gly Leu Gly Thr Ile
      130                 135                 140
Thr Asn Thr Asn Pro Leu Leu Asp Thr Pro Gly Val Leu Gly Val Lys
145                 150                 155                 160
Thr Gly Ser Ser Thr Pro Ala Gly Gly Asn Leu Leu Trp Ala Tyr Glu
              165                 170                 175
Val Arg Val Gly Gly Ala Pro Arg Leu Leu Val Gly Ala Val Leu His
              180                 185                 190
Gln Arg Ala Asn Thr Thr Pro Ala Glu Gly Leu Arg Ala Ala Val Glu
              195                 200                 205
Ala Ala Arg Gly Leu Leu Thr Ala Val Arg Glu Arg Leu Ala Ala Ala
      210                 215                 220
Gly Thr Gln Gly Gly Glu Arg
225                 230
```

```
<210> 34
<211> 386
<212> PRT
<213> Streptomyces bikiniensis
```

```
<400> 34
Met Ala Leu Thr Val Gly Val Leu Val His Asp Ser Val Leu Arg Arg
  1               5                  10                  15
Ser Leu His Glu Gly Ala Gly Arg Ala His Val Ala Leu Ala Thr Ala
               20                  25                  30
Leu Glu Asp Ala Asp Ala Ala Gly Glu Glu Gly Pro Arg Val Ser Pro
               35                  40                  45
Glu Glu Leu Pro Glu Ala Leu Leu Arg Gln Ile Glu His Gly Gly Glu
       50                  55                  60
Ala Thr Leu Tyr Glu Asp Gly Pro Pro Ala Pro Val Phe Arg Ala Ala
```

```
65                      70                      75                      80
Arg Arg Glu Gly Gly Lys Leu Tyr Ala Val Glu Val Asp Met Thr Ala
                    85                  90                  95
Asp Leu Leu Thr Arg Gln Ala Leu Asp Arg His Met Trp Lys Tyr Ser
            100                 105                 110
Leu Leu Thr Leu Gly Val Val Val Pro Ala Thr Ala Leu Ala Thr Glu
            115                 120                 125
Leu Pro Ala Arg Arg Leu Arg Arg Val Ala Arg Thr Ala Arg Arg Ile
        130                 135                 140
Thr Ala Gly Asp Leu Asp Ala Arg Thr Gly Thr Val Arg Gly Gly Asp
145                 150                 155                 160
Glu Val Ala Glu Ile Ser Ala Val Val Asp Ser Met Ala Asp Ser Leu
                165                 170                 175
Gln Gln Arg Ile Asp Thr Glu Gln Arg Phe Thr Ala Asp Val Ala His
                180                 185                 190
Glu Leu Arg Thr Pro Leu Met Gly Leu Val Thr Ser Ala Glu Leu Leu
                195                 200                 205
Pro Glu Gly Glu Val Thr Asp Met Val Gln Ser Arg Val Arg Val Leu
            210                 215                 220
Arg Asp Leu Val Glu Asp Leu Leu Glu Val Ser Arg Leu Asp Ala Gly
225                 230                 235                 240
Ala Glu Thr Ala Gln Gln Gly Pro Val Asp Leu Gly Ala Leu Val Arg
                245                 250                 255
Asp Ser Val Ala Arg Thr Gly Leu Ala Ala Gln Val Thr Arg Gln Gly
            260                 265                 270
Ala Ala Val Val Glu Ser Asp Pro Arg Arg Leu Asp Arg Ile Val Ser
            275                 280                 285
Asn Leu Val Val Asn Ala His Arg His Gly Ala Gly Arg Val Glu Val
    290                 295                 300
Thr Val Ala Gly Arg Thr Val Thr Val Arg Asp His Gly Pro Gly Phe
305                 310                 315                 320
Pro Ala Asp Leu Leu Ser His Gly Pro Gln Arg Phe Arg Thr Gly Ser
            325                 330                 335
Ala Glu Arg Gly His Gly His Gly Leu Gly Leu Thr Ile Ala Ser Gly
        340                 345                 350
Gln Ala Arg Val Ile Gly Ala Thr Leu Ala Phe Ala Asn Ala Arg Asp
    355                 360                 365
Gly Gly Ala Val Ala Thr Leu Ser Leu Pro Glu Asp Gly Gln Thr Ser
    370                 375                 380
Glu Ala
385


<210> 35
<211> 228
<212> PRT
<213> Streptomyces bikiniensis

<400> 35
Val Thr Val Leu Leu Val Glu Asp Asp Glu Val Ile Arg Arg Ser Val
  1               5                   10                  15
Ala Met Ser Leu Glu Arg Tyr Gly Tyr Arg Val Arg Val Ala Ala Asp
            20                  25                  30
Gly Leu Thr Gly Leu Glu Leu Phe Arg Glu Gly Arg His Asp Leu Val
        35                  40                  45
Leu Leu Asp Val Met Leu Pro Gly Leu Asp Gly Ile Gly Leu Cys Arg
    50                  55                  60
```

82

```
Arg Ile Arg Glu Thr Ala Thr Asp Pro Ile Leu Met Met Ser Ala Arg
65                  70                  75                  80
Gly Asp Ala Leu Asp Val Val Ser Gly Leu Glu Ala Gly Ala Asp Asp
                85                  90                  95
Tyr Val Val Lys Pro Val Asp Thr Ala Val Leu Val Ala Arg Ile Arg
                100                 105                 110
Ser Leu Leu Arg Arg Ala Ala Phe Val Ser Pro Ala Pro Gly Pro Ala
                115                 120                 125
Asp Pro Ala Thr Pro Ala Gly Pro Leu Leu Phe Gly Asp Leu Ser Leu
        130                 135                 140
Asp Pro Ala Ala Leu Glu Val Arg Arg Gly Gly Glu Arg Ile Ala Leu
145                 150                 155                 160
Ala Pro Thr Glu Leu Arg Leu Leu Leu Gln Phe Ala Ala His Pro Gly
                165                 170                 175
Ile Val Leu Asp Arg Gln Thr Leu Leu Arg Glu Val Trp Asp Tyr Gly
                180                 185                 190
Trp Asp Gly Asp Thr Arg Val Val Asp Leu Cys Val Gln Arg Leu Arg
        195                 200                 205
Lys Lys Ile Gly Ala Glu Arg Val Glu Thr Val Arg Gly Phe Gly Tyr
        210                 215                 220
Lys Trp Lys Arg
225


<210> 36
<211> 476
<212> PRT
<213> Streptomyces bikiniensis

<400> 36
Met Pro Glu Ser Arg Pro Ala Pro Glu Pro Thr Lys Thr Glu Asp Gly
  1               5                   10                  15
Thr Asp Ala Arg Pro Asp Thr Pro Ala Arg Pro Gly Asp Thr His Pro
                20                  25                  30
Val Asp Gln Met Leu Pro Pro Leu Lys Leu Phe Ser Ala Gly Leu Gln
                35                  40                  45
His Val Ala Ala Met Tyr Ala Gly Val Val Ala Pro Pro Leu Val Val
        50                  55                  60
Gly Ile Gly Val Gly Leu Ser Thr Ala Asp Ile Ala Phe Leu Met Ser
65                  70                  75                  80
Ala Ser Leu Phe Thr Ser Gly Ile Ala Thr Leu Leu Gln Thr Leu Gly
                85                  90                  95
Phe Trp Lys Val Gly Ala Arg Leu Pro Phe Val Asn Gly Val Ser Phe
                100                 105                 110
Ala Gly Val Ala Pro Met Leu Ala Ile Ala Lys Ala Glu Gly Pro Asp
                115                 120                 125
Asp Ala Leu Pro Val Ile Tyr Gly Ala Val Ile Val Ala Gly Val Phe
        130                 135                 140
Gly Phe Leu Leu Ala Pro Phe Phe Cys Lys Leu Ile Arg Phe Phe Pro
145                 150                 155                 160
Pro Val Val Thr Gly Thr Val Ile Thr Leu Ile Gly Val Ser Leu Leu
                165                 170                 175
Pro Val Ala Phe Asn Trp Ala Gln Gly Gly Asn Ala Gln Ala Pro Asp
                180                 185                 190
Tyr Gly Ser Leu Thr Tyr Ile Gly Leu Ala Thr Ala Thr Leu Leu Ile
        195                 200                 205
Thr Val Val Leu Arg Arg Val Leu Thr Gly Phe Leu Lys Gln Ile Ser
```

83

```
          210                    215                    220
Ile Leu Leu Gly Leu Val Ala Gly Thr Leu Leu Ser Leu Pro Leu Gly
225                    230                    235                    240
Val Ala Asp Phe Ser Ala Val Gly Asp Ala Asp Val Ile Gly Leu Pro
                245                    250                    255
Thr Pro Phe His Phe Gly Ala Pro Gln Phe Ala Ala Ala Ala Ile Ile
                260                    265                    270
Ser Met Cys Ile Val Met Leu Val Ser Met Thr Glu Ser Thr Ala Asp
            275                    280                    285
Val Leu Ala Leu Gly Glu Ile Val Glu Arg Pro Ala Asp Glu Lys Thr
        290                    295                    300
Leu Ala Ala Ala Leu Arg Ala Asp Gly Leu Gly Thr Ala Leu Ser Pro
305                    310                    315                    320
Leu Phe Asn Gly Phe Ala Ala Ser Ala Phe Ala Gln Asn Val Gly Leu
                325                    330                    335
Val Ala Ile Thr Lys Val Arg Ser Arg Phe Val Val Ala Ala Ala Gly
            340                    345                    350
Gly Ile Leu Leu Leu Leu Gly Leu Cys Pro Leu Leu Ala Ser Val Val
            355                    360                    365
Ala Leu Ile Pro Gln Pro Val Leu Gly Gly Val Gly Ile Ala Leu Phe
        370                    375                    380
Gly Thr Val Ala Ala Ser Gly Ile Gln Thr Leu Ala Gly Ala Ala Leu
385                    390                    395                    400
Glu Arg Gly Asp Asn Val Leu Ile Val Ala Ile Ser Leu Gly Ala Gly
                405                    410                    415
Ile Ile Pro Ile Ala Ala Pro Asp Phe Tyr His Ala Phe Pro Glu Gly
                420                    425                    430
Ala Arg Ile Val Leu Asp Ser Gly Ile Ser Thr Gly Cys Val Val Ala
            435                    440                    445
Val Leu Leu Asn Leu Ala Phe Asn His Leu Gly Arg Arg Thr Asp Pro
        450                    455                    460
Ala Pro Glu Thr Leu Pro Ala Pro Ala Ala His His
465                    470                    475
```

```
Met Pro Pro Ala Asp Asp Pro Tyr Ala Leu Pro Arg Phe Asp Pro Thr
  1               5                    10                    15
Arg Ala Ala Ala Val Arg Ala Gln Leu Gly Leu Thr Leu Gly Gln Val
            20                    25                    30
Ala Trp Ala Val Thr Ala Tyr Cys Gly His Pro Ala His Pro Gly Leu
        35                    40                    45
Val Glu Ala Trp Glu Ala Gly Thr Ala Thr Pro Asp Asn Thr Gln Val
        50                    55                    60
Lys Ala Leu Ala Ala Ala Leu Trp Cys Ser Pro Val Asp Leu Val Glu
65                    70                    75                    80
Glu Pro Gly Thr Leu Ala Gln Cys Arg Thr Val Ala Gly Leu Thr Val
                85                    90                    95
Asn Glu Thr Ala Thr Glu Leu Gly Leu Thr Arg Gly Gln Trp Glu Asp
            100                    105                    110
Ala Glu Arg Arg Asn Arg Trp Gln Gly Thr Pro Ala Gln Thr Asp Ala
        115                    120                    125
```

Leu Leu Arg Val Leu Cys Pro Pro Pro Ala Cys Phe Val Ala Ala Cys
    130   135   140
Gly Arg Thr Gly Arg Leu Arg Val Leu Leu Arg Glu Ala Ala Thr Thr
145   150   155   160
Trp Trp Pro Pro Tyr Val Gly Ala Leu Ser Arg Ile Val Pro Leu Asp
            165   170   175
Pro Ala Val Leu Gly His Ala Leu Glu Arg Leu His Leu Thr Tyr Gln
            180   185   190
Gln Trp Glu Gly Ala Ala Gly Gly Pro Pro Arg Gln Ala Ala Arg Ala
            195   200   205
Glu Ala Arg Ala Ala Asp Phe Leu Glu His Ile Asp Leu His Leu Trp
210   215   220
His His Val Arg Glu Val Leu Asn Pro Ala Arg Pro Ala Ser
225   230   235

<210> 38
<211> 612
<212> PRT
<213> Streptomyces bikiniensis

<400> 38
Val Ser Gln Gly Pro Ala Leu Leu Pro Arg Ala Thr Asp His Ala Ser
  1   5   10   15
Pro Thr Pro Pro His Pro Val Asp Glu Ile Leu Pro Ala Arg Arg Met
            20   25   30
Leu Pro Ala Ala Leu Gln His Val Ala Ser Met Tyr Ala Gly Leu Thr
            35   40   45
Ala Pro Pro Leu Ile Ile Ser Ser Ala Leu Gly Leu Thr Pro Ala Gln
    50   55   60
Leu Ser Ala Leu Leu Ala Ala Ala Leu Leu Ile Ala Gly Leu Gly Thr
65   70   75   80
Ile Ala Gln Thr Leu Gly Val Tyr Gly Val Gly Ala Gly Leu Pro Leu
            85   90   95
Val Asn Gly Val Ser Phe Ala Val Val Ser Pro Ala Leu Ala Thr Ala
            100   105   110
Ala Thr Gln Gly Arg Asp Gly Ala Leu Pro Ala Ile Phe Gly Ala Thr
            115   120   125
Leu Val Ala Gly Leu Leu Cys Leu Leu Leu Ala Pro Val Phe Cys Arg
    130   135   140
Leu Val Arg Phe Phe Pro Pro Val Val Ser Gly Cys Val Ile Thr Leu
145   150   155   160
Val Gly Ile Ser Leu Leu Pro Val Ala Gly Thr Trp Ala Arg Gly Gly
            165   170   175
Asp Ala Glu Ala Ala Gly Phe Gly Ser Pro Ala Asp Leu Ala Leu Ala
            180   185   190
Ala Thr Thr Leu Val Ile Thr Leu Thr Val His Arg Met Leu Ser Gly
            195   200   205
Arg Phe Leu Gly Arg Val Ala Ile Leu Ile Gly Met Leu Ala Gly Thr
    210   215   220
Leu Ile Ala Ile Pro Leu Gly Lys Val Asp Leu Asp Pro Leu Ala Gln
225   230   235   240
Ala Pro Leu Phe Ala Leu Pro Thr Pro Phe Gly Phe Gly Thr Pro Gln
            245   250   255
Phe Val Pro Thr Val Ile Ala Thr Ala Ala Val Val Met Ile Val Ser
            260   265   270
Met Met Glu Ser Thr Ala Ala Leu Leu Ala Leu Gly Ala Val Ala Glu

```
          275                    280                      285
Arg Pro Val Arg Asp Arg Thr Ile Ala Gly Ser Leu Arg Ala Leu Gly
    290                    295                  300
Leu Ala Thr Val Leu Gly Gly Val Leu Gly Ser Phe Thr Ser Thr Ser
305                    310                  315                320
Tyr Ala Gln Asn Val Gly Leu Val Ser Leu Ser Arg Ile Arg Ser Arg
                   325                  330                  335
Tyr Val Val Thr Leu Cys Gly Ala Val Leu Val Leu Met Gly Phe Val
               340                  345                  350
Pro Val Leu Gly Ser Phe Val Ala Leu Val Pro Leu Pro Val Leu Gly
           355                  360                  365
Gly Ala Gly Val Val Phe Phe Gly Ser Val Ala Val Thr Gly Ile Arg
       370                  375                  380
Thr Leu Ala Lys Ala Ala Leu Gly Thr Gly His Asn Ala Val Ile Val
385                    390                  395                400
Ser Val Thr Leu Ala Phe Gly Leu Phe Pro Val Leu Asp Pro Asp Phe
                   405                  410                  415
Tyr Ala Arg Leu Pro Ala Pro Val Ala Thr Val Leu Gly Ser Gly Ile
               420                  425                  430
Thr Ala Gly Cys Leu Val Ala Val Leu Leu Asn Tyr Leu Leu Asn His
           435                  440                  445
Leu Gly Arg Gly Thr Glu Ala Asp Pro Asp Ala Ile Ser Ala Glu Gln
       450                  455                  460
Val Thr Ala Leu Asp Thr Ala Asp Thr Val Leu Gly Pro Lys Arg Ser
465                    470                  475                480
Ser Asp Trp Thr Pro Phe Gln Pro Ser Gly Ser Pro Ser Gly Thr Pro
                   485                  490                  495
Asp His Gly Arg His Thr Arg Gly Thr Ala Arg Pro Ala Pro Ala Trp
               500                  505                  510
Pro Tyr Val Thr Gly Pro Val Asp Pro Thr Asp Thr Gly Arg His His
           515                  520                  525
Arg Pro His Glu Val Pro Ala Pro Pro His Arg Pro Asp Glu Val Pro
       530                  535                  540
Pro Pro Leu His Pro Ser Ala Ala His Glu Gly Glu Pro Pro Pro Ala
545                    550                  555                560
Val Thr Glu Asn Ala Val Phe Pro Gly Pro Leu His Pro Leu His Pro
                   565                  570                  575
Leu His Pro Arg Pro Thr Gly Arg Pro Asp Arg Pro Arg Gln Arg His
               580                  585                  590
Ser Ala Glu Ala Asp Pro Trp Gln His Pro Gln Thr Pro Ser Ala Ser
           595                  600                  605
Gly Asp Ser Gln
       610


<210> 39
<211> 223
<212> PRT
<213> Streptomyces bikiniensis

<400> 39
Met Thr Thr Val Ser Ala Ala Arg His Arg Ala Gly Gly Ser Pro Arg
 1               5                  10                  15
Gly Gly Thr Ser Arg Pro Gly Pro Asp Glu Arg Ile Ala Gln Val Val
           20                  25                  30
Ala Glu Ala Leu Gly Ser Ala Arg Thr Val Leu Asp Pro Asp Ala Leu
       35                  40                  45
```

86

Pro Gly Leu Gly Thr Thr Arg Leu Pro Phe Gly Asp Gly Arg Phe Asp
    50   55   60
Ala Ala Met Met Leu Cys Asn Ala Pro Gly Val Pro Asp Ala Leu Ser
65   70   75   80
Arg Leu Gly Glu Leu Arg Arg Val Thr Arg Gly Pro Val Val Val Leu
                85   90   95
Ala Thr Asp Pro Ser Arg Val Arg Ser Phe Trp Leu Asp Arg Tyr Ala
            100   105   110
Pro Glu Val Leu Ala Val Glu Ala Arg Arg His Pro Pro Ile Ala Asp
        115   120   125
Leu Thr Ala Val Leu Gly Gly Ser Ala Glu Val Arg Ser Val Pro Val
    130   135   140
Pro Leu Asp Cys Thr Asp Thr Phe Asp Glu Ala Tyr Tyr Gly Arg Pro
145   150   155   160
Glu Lys Leu Leu Asp Pro Ser Ala Arg Gln Ala Gly Ser Ala Trp Ser
                165   170   175
Phe Val Asp Asp Arg Val Arg Glu Glu Phe Asp Thr Thr Leu Arg Arg
            180   185   190
Glu Leu Arg Ser Gly Glu Trp Asp Glu Arg Phe Gly His Leu Arg Arg
        195   200   205
Arg Pro Val Tyr Glu Gly Ser Leu Val Ile Val Arg Ala Val Pro
    210   215   220

<210> 40
<211> 251
<212> PRT
<213> Streptomyces bikiniensis

<400> 40
Met Thr Thr Gly Thr Asp Ser Thr Thr Trp Phe Arg Arg Tyr Ser Ser
 1   5   10   15
Thr Pro Ala Pro Arg Arg Arg Leu Ala Val Leu Pro His Ala Gly Gly
            20   25   30
Ser Ala Ser Phe Phe His Ala Trp Gly Ser Ala Phe Gly Gly Asp Thr
            35 .   40   45
Glu Val Leu Val Ala Gln Tyr Pro Gly Arg Gln Glu Arg Phe Asn Glu
    50   55   60
Pro Phe Val Asp Arg Met Asp Val Leu Ala Asp Arg Val Thr Ala Ala
65   70   75   80
Leu Leu Pro Leu Ala Asp Val Pro Leu Thr Leu Phe Gly His Ser Met
                85   90   95
Gly Ala Ser Leu Ala Tyr Glu Val Ala Leu Arg Leu Glu Glu Arg His
            100   105   110
Arg Val Thr Pro Ala Ala Leu His Val Ser Ser Arg Lys Ala Pro His
        115   120   125
Arg Leu Thr Pro Leu Asp Leu His Arg Lys Gly Asp Asp Glu Leu Val
    130   135   140
Ala Val Leu Arg Gly Leu Gly Gly Thr Asp Thr Ala Leu Leu Asp Asp
145   150   155   160
Pro Asp Ile Arg Gln Leu Val Leu Pro Ala Val Arg Ala Asp Phe Thr
                165   170   175
Val Val Ser Thr Tyr Gly Pro Arg Val Pro Thr Ala Val Gly Cys Pro
            180   185   190
Val His Ala Trp Ile Gly Asp Thr Asp Pro Asn Val Ala Val Gly Asp
        195   200   205
Met Asp Ala Trp Ala Asp Val Ala Pro Glu Gly Phe Arg Val Arg Val

87

```
        210                    215                  220
Leu Pro Gly Gly His Phe Tyr Leu Leu Gln Gln His Glu Thr Leu Met
225                    230                  235                  240
Arg Glu Leu Ser Gly His Leu Ala Gly Asp Arg
                245                  250



<210> 41
<211> 316
<212> PRT
<213> Streptomyces bikiniensis

<400> 41
Met Asp His Arg Arg Ala Arg Ala Ala Leu Pro Leu Ser Arg His Val
  1               5                  10                  15
Arg Asp Gly Asp Ala Pro Ser Gly Thr Ala Ala Leu Ala Gly Asp Thr
                20                  25                  30
Gly Arg Arg Ala Ala Pro Arg Cys Thr Asp Pro Pro Glu Arg Ala Ala
          35                  40                  45
Arg Val Gly Gln Gly Pro Gly Asp Arg Gly Ala Arg Arg Arg Val Pro
      50                  55                  60
Arg Ala Ala Asp Arg Pro Leu Ala Ala Pro Pro Ala Arg Leu Ala Pro
65                  70                  75                  80
Gly Pro Leu Ser Ala Gly Arg Pro Gln Pro Gly Gln His Pro Gly Thr
                85                  90                  95
Gly Gly Val His Ala Arg Ala Gly Gly Arg Gly Ala Pro Val Arg Leu
                100                 105                 110
His Ala Gly Gly Ala Gly Ala Gly Ala Gly Arg Val Glu Gly Thr Pro
          115                 120                 125
Ala Ala Gly Pro His Arg Glu Pro Gly Val Val Arg Arg Pro Arg Gly
          130                 135                 140
Leu Ala Val His Arg Gly Arg Pro Arg Asp Arg Arg Ala Gly Ala Asp
145                 150                 155                 160
Arg Gly Pro Arg Arg Gly Ala Pro His Gly Ala Asp Ala Gly Arg Gly
                165                 170                 175
Val Arg Pro Asp Thr Gly Leu Pro Gln Val Ala Ala Pro Ala Ala Arg
                180                 185                 190
Gly Ala Asp Arg Ala Ala Asp Arg Leu Val His Ala Gly Pro Ala Gly
          195                 200                 205
Arg Ala Gln Arg Arg Arg Gly Gly Gly His Pro Gly Gly Ala Ala Pro
      210                 215                 220
Pro Gly Pro Asp Gly Glu Arg Leu Gly Arg Leu Leu Pro Arg Pro Gly
225                 230                 235                 240
Pro Ala Val Arg Arg Gln Gln Pro Glu Ala Gly Ile Gly Arg Trp Ser
                245                 250                 255
Gly Arg Arg Gly Arg Arg Phe Gly Arg His Gly Arg Arg His Arg Asp
          260                 265                 270
Arg Arg Gly Thr Ala Glu Leu Gly His His Arg Pro Glu Val Gly Ser
          275                 280                 285
Gly Thr Val Gln Asp Arg Asp Val His Gly Pro Arg Glu Asp Arg Val
          290                 295                 300
Arg Asp His Gly His Arg Cys Arg Glu Leu Pro Gly
305                 310                 315



<210> 42
<211> 240
```

88

<212> PRT
<213> Streptomyces bikiniensis

<400> 42
Met Phe Arg Thr Glu Glu Lys Arg Pro Val Ala Thr Gly Thr Thr Ala
1   5   10   15
His Asp Ala Val Arg Gly His Pro Asp Ala His Ala Ala Gly Phe Gly
            20   25   30
Arg Pro Arg Arg Val Thr Val Ala Val Tyr Ala Ala Asp Pro Val Leu
        35   40   45
Arg Val Gly Val Val Gln Gln Leu Arg Gln Arg Pro Glu Thr Glu Leu
    50   55   60
Val Asp Asp Ala Asp Ala Glu Asn Ala Gln Val Ser Leu Val Val Val
65   70   75   80
Asp Ala Leu Asp Asp Asp Val Thr Ala Leu Leu Thr Arg Leu Ser Tyr
            85   90   95
Asn Gly Ala Thr Arg Ala Gly Leu Val Ile Gly Thr Leu Gly Val Gly
            100   105   110
Ala Leu Gln Arg Val Val Glu Cys Gly Val Ser Ala Val Leu Arg Arg
        115   120   125
Ala Glu Ala Asp Gln Asp Gln Leu Val Gln Leu Val Leu Ala Val Ala
        130   135   140
Asn Gly Glu Gly Val Leu Pro Gly Asp Leu Leu Gly Glu Leu Leu Gly
145   150   155   160
His Val Gly Ser Leu Arg Arg Ala Ala Leu Asp Pro Gly Ala Leu Pro
                165   170   175
Leu Ser Thr Leu Thr Ser Arg Glu Ala Glu Met Leu Arg Leu Val Ser
            180   185   190
Glu Gly Leu Asp Thr Ala Ala Ile Ala Arg Lys Thr Ser Tyr Ser Glu
        195   200   205
Arg Thr Val Lys Asn Val Leu His Glu Ile Thr Thr Arg Leu Gln Leu
    210   215   220
Arg Asn Arg Ala His Ala Val Gly Tyr Ala Leu Arg Asn Gly Leu Ile
225   230   235   240

<210> 43
<211> 1066
<212> PRT
<213> Streptomyces bikiniensis

<400> 43
Met Lys Thr Ala Gly Pro Gly Gly Arg His Arg Arg Gly Arg Leu Ala
1   5   10   15
Ser Ala Leu Leu Leu Leu Val Pro Leu Leu Gly Ala Thr Gly Val Ala
            20   25   30
Gly Pro Asp Asp Pro Arg Thr Ala Ala Ala Ala Ala Asp Ala Ala Glu
        35   40   45
Thr Thr Arg Ile Ala Tyr Ala Gly Thr Gly His Arg Ser Leu Gly Glu
    50   55   60
Pro Ala Ser Thr Asp Ser Ser Thr Pro Leu Phe Gly Ala Gly Pro Thr
65   70   75   80
His Tyr Asp Thr Asp Pro Ser Ala Leu Gly Asp Arg Leu Val Phe Ala
            85   90   95
Ser Arg Arg Asp Glu Lys His Pro Gln Ile Tyr Leu Arg Gly Ala Asp
        100   105   110
Gly Gly Val Leu Arg Leu Thr Ser Gly Leu Asp Ala Ala Arg Pro Arg

```
                115                      120                      125
Leu Thr Pro Asp Gly Gly Ser Val Leu Phe Asp Ala Ala Asp Pro Ala
    130                      135                      140
Gly Gly Ser Gln Arg Asp Leu Trp Leu Val Arg Thr Asp Gly Thr Gly
145                      150                      155                      160
Leu Thr Arg Leu Thr Asp Thr Pro Ala Ser Glu Glu Asp Pro Ala Val
                165                      170                      175
Ser Pro Asp Gly Ala Arg Ile Ala Tyr Ser Ser Asp Ala Asp Pro Leu
            180                      185                      190
Ala Gly Arg Gln Ile Tyr Val Arg Ala Leu Thr Gly Gly Ile Pro Thr
            195                      200                      205
Arg Leu Thr Asp Pro Ala Arg Gly Thr Ala Ser Glu Pro Ala Trp Asn
    210                      215                      220
Pro Val Asp Asp Asp Val Asn Arg Ala Trp Ile Ala Tyr Thr Ser Thr
225                      230                      235                      240
Thr Thr Glu Asp Gly Arg Thr Arg Gln Arg Leu Arg Ile Thr Asp Gly
                245                      250                      255
Thr Thr Asp Glu Thr Leu Phe Thr Gly Ala Tyr Ala Asn Trp Gln Gly
            260                      265                      270
His Gly Ala Ala Trp Leu Pro Asp Gly Asp Gly Ile Val Phe Leu Ser
    275                      280                      285
Pro Glu Thr Thr Cys Thr Cys Arg Thr Pro Tyr Asp His Val Phe Arg
    290                      295                      300
Ser Val Val His Ala Asp Arg Glu Pro Ser Leu Val Leu Asp Glu Asp
305                      310                      315                      320
Arg Asp Val Leu Ser Pro Thr Trp Ile Gly Thr Ala Glu Gly Gly His
                325                      330                      335
Ala Ile Val Glu Arg Ser Ser Ala Ala Thr Ala His Thr Ala Thr Leu
            340                      345                      350
Gln Asp Ile Arg Ala Asp Gly Ser Asp Pro Arg Asp Leu Gln Arg Lys
            355                      360                      365
Ile Leu Arg Glu Asp Pro Gln Ala Asp Thr Asn Thr Asp Pro Ala Lys
    370                      375                      380
Asp Pro Leu Phe Gln Pro Ala Pro Phe Asp Pro Trp Thr Glu Arg
385                      390                      395                      400
Gln Asn Tyr Thr Pro Asp Gly Arg Arg Leu Val Leu Thr Arg Phe Glu
                405                      410                      415
Gly Pro Asp Asp Ala Arg Ile Glu Arg Ile Trp Thr Ala Asp Ala Asp
            420                      425                      430
Gly Thr Asn Glu Ala Pro Met Pro Leu Asp Gly Arg Gly Ala Arg Asp
            435                      440                      445
Trp Asp Thr Asp Pro Thr Phe Ser Pro Asp Gly Thr Arg Leu Ala Phe
    450                      455                      460
Thr Arg Thr Ser Pro Gly Gly Val Gly Glu Ala Ala Gly Asp Ser Arg
465                      470                      475                      480
Ile Leu Leu Ala Glu Val Ala Thr Gly Arg Ile Thr Gly Glu Ile Val
                485                      490                      495
Pro Pro Ala Gly Glu Leu Arg Gly Gly Asp Ala Gln Pro Thr Trp Ser
            500                      505                      510
Ser Asp Gly Thr Thr Leu Ala Phe Thr Arg Ala Arg Gln Ile Ala Gly
            515                      520                      525
Gly Gly Gly Ser Lys His Val Trp Thr Ala Ser Thr Ala Asp Leu Thr
    530                      535                      540
Arg Gln Arg Asp Leu Ser Ala Thr His Cys Pro Arg Asp Cys Asp Val
545                      550                      555                      560
Ile Asp Asp Ser Pro Ala Phe Ser Pro Asp Gly Arg Ser Leu Ala Phe
                565                      570                      575
```

90

```
Asn Arg Lys Asn Gly Gly Gly Arg Ile Asp Glu Arg Asn Gly Leu Leu
            580             585             590
Leu Thr Thr Leu Ser Gly Asp Ala Cys Gln Val Leu Leu Pro Thr Ala
        595             600             605
Ala Arg Gly Gln Asp Gly Ala Cys Glu Arg Glu Leu Pro Asp Thr Thr
    610             615             620
Leu Thr Gly Pro His Gln Pro Arg Asp Ala Ala Trp Thr Ala Asp Gly
625             630             635             640
Lys Arg Leu Val Phe Ser Ser Arg Ala Ala Ala Ala Val Asn Ser Pro
            645             650             655
Glu Lys Leu Asn Val Leu Asp Val Gly Ser Gly Asp Ile Thr Pro Leu
            660             665             670
Thr Ala Glu Leu Ala Gly Arg Gln Lys Glu Pro Thr Val Gln Gln Ser
            675             680             685
Val Asp Leu Ala Val Glu Ala Pro Ala Thr Thr Pro Asp Val Thr Val
    690             695             700
Gly Ala Ser Gly Thr Val Thr Val His Val Val Asn His Gly Pro Ala
705             710             715             720
Ala Ser Pro Gly Thr Arg Leu Thr Val Val Pro Pro Ser Gly Val Arg
            725             730             735
Ile Thr Gly Ile Glu Trp Pro Gly Gly Thr Cys Asp Ala Ala Ser Leu
            740             745             750
Gln Cys Asp Leu Gly Val Val Glu Ala Gly Ala Gln Val Pro Val Asp
            755             760             765
Val Thr Leu Thr Gly Val Thr Ala Gly Asp Ala Pro Val Asp Trp Ser
    770             775             780
Val Thr Gly Ala Val Leu Asp Pro Arg Pro Gly Asp Asn Asp Gly Arg
785             790             795             800
Ser Val Ile Pro Val Arg Glu Ala Pro Pro Thr Pro Thr Pro Thr Pro
            805             810             815
Thr Pro Thr Pro Thr Pro Thr Pro Thr Pro Thr Pro Thr Pro Thr Pro
            820             825             830
Thr Arg Thr Pro Thr Pro Thr Pro Thr Pro Thr Arg Pro Pro Gln Pro
            835             840             845
Pro Ala Pro Lys Ala Gly Pro Gly Val Arg Ile Thr Val Gln Pro Glu
    850             855             860
Pro Gly Tyr Val Gly Gly Arg Val Val Val Thr Tyr Ser Val Arg Asn
865             870             875             880
Gly Arg Asn Ala Leu Ala Thr Gly Leu Arg Leu Arg Ile Gly Leu Pro
            885             890             895
Ala Gly Val Pro His Gly Gly Leu Pro Ala Gly Cys Asp Arg Asn Gly
            900             905             910
Ala Cys Ala Leu Pro Asp Leu Thr Pro Gly Thr Thr Ala Val Leu Arg
    915             920             925
Val Val Leu Ser Pro Lys Lys Ala Met Thr Ala Arg Val Thr Ala Val
    930             935             940
Leu Asp Thr Thr Gly Thr Asp Ala Asp Arg Ser Asp Asn Thr Ala Arg
945             950             955             960
Glu Arg Leu Arg Val Leu Gln Pro Arg Ile Val Ala Val Pro Asp Ile
            965             970             975
Gly Lys Pro Gly Phe Val Thr Ser Val Arg Gly Val Asp Phe Pro Pro
            980             985             990
Gly Val Pro Val Arg Phe Ser Trp Asn Pro Gly Ile Thr Ala Ala Ala
            995             1000            1005
Ser Pro Thr Phe Pro Glu Ala Asp Gly Thr Phe Ile Gly Gln Leu Leu
    1010            1015            1020
Ile Leu Ala Lys Asp Gln Thr Gly Pro Arg Thr Ile Thr Ala Ser Gly
```

```
1025                1030                1035                1040
Pro Gly Phe Ser Pro Val Lys Thr Asp Phe Leu Val Val Ser Gly Thr
                1045                1050                1055
Val Gln Pro Pro Asp Gly Val Thr Arg Arg
            1060                1065


<210> 44
<211> 22
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Construct

<400> 44
Thr Thr Cys Gly Ala Tyr Ser Cys Ser Gly Val Ser Thr Thr Cys Thr
 1               5                  10                  15
Thr Cys Gly Ser Ala Thr
            20


<210> 45
<211> 23
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Construct

<400> 45
Gly Cys Ser Ala Thr Gly Gly Ala Tyr Cys Cys Ser Cys Ala Arg Cys
 1               5                  10                  15
Ala Arg Cys Gly Ser Val Thr
            20


<210> 46
<211> 22
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Construct

<400> 46
Ser Ser Cys Thr Ser Gly Thr Ser Gly Cys Ser Met Thr Ser Cys Ala
 1               5                  10                  15
Tyr Cys Trp Ser Gly Cys
            20


<210> 47
<211> 23
<212> PRT
<213> Artificial Sequence
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<220>
<223> Synthetic Construct

<400> 47
Gly Thr Ser Cys Cys Ser Gly Thr Ser Cys Cys Arg Thr Gly Ser Ser
 1   5   10   15
Cys Tyr Thr Cys Ser Ala Cys
            20

<210> 48
<211> 22
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Construct

<400> 48
Ala Ser Arg Thr Gly Ser Gly Cys Arg Thr Thr Ser Gly Thr Ser Cys
 1   5   10   15
Cys Ser Ser Trp Ser Ala
            20

<210> 49
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Construct

<400> 49
cgtcagcctg atcctcgccg a   21

<210> 50
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Construct

<400> 50
tccaggtggc cgacgttcgt c   21

<210> 51
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Construct

<400> 51
aacgagatcc cgccgggcct c   21

93

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<210> 52
<211> 17
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Construct

<400> 52
cgcgttgctg ggcgagg                                                        17


<210> 53
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Construct

<400> 53
ggacgtctgc cggagggttc c                                                   21


<210> 54
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Construct

<400> 54
ggcccgttgg gcacggacag a                                                   21


<210> 55
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Construct

<400> 55
tttgcatgcg atgttgacga tctcctcgtc                                          30


<210> 56
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Construct

<400> 56
ggaagcttca tatgttctct ccggaatgtg                                          30


<210> 57
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<211> 31
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Construct

<400> 57
ttaagctttc tagagaggag aggccgtgaa c                              31

<210> 58
<211> 31
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Construct

<400> 58
aaagaattcg aactcgagca cggactcgtt g                              31

<210> 59
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Construct

<400> 59
gacacggccg gtgagagcag c                                         21

<210> 60
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Construct

<400> 60
cttctagatg tcgcggtgta cgg                                       23

<210> 61
<211> 42
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic Construct

<400> 61
cttaagggtt aattaaggag gacacatatg tccggagaat tc                  42

<210> 62
<211> 5
<212> PRT
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<213> Artificial Sequence

<220>
<223> Synthetic Construct

<400> 62
Met Ser Gly Glu Phe
 1   5